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The Farmer's Digest

EDITORIAL STAFF:
Editor—L. Bush-Brown Assistant Editor—C. Leavitt Dyer
Business Manager—A. E. Heick

Associate Editors—
John A. Andrew, Jr., James Bush-Brown, Ruth Patrick

ADVISORY EDITORIAL STAFF:

William A. Albrecht
Chairman, Department of Soils
University of Missouri

John D. Beck
Professor of Veterinary Medicine
University of Pennsylvania

Hugh H. Bennett
Chief, U. S. Soil Conservation Service

H. J. Reed
Dean of the School of Agriculture
Director of the Experiment Station and of
Agricultural Extension, Purdue University

W. T. Spanton
Chief, Agricultural Education Service
United States Office of Education

M. L. Wilson
Director of Agricultural Extension
United States Department of Agriculture

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The Farmer's Digest

Volume 15 December, 1951 Number 6

Winter Care of Machinery

Condensed from the Nebraska Farmer

John C. Steele

WHAT needs to be done to get farm machinery ready for winter?

All equipment should be cleaned, metal surfaces and moving parts protected, and it should then be stored under cover, if possible. Rust, corrosion, and decay shorten machinery life, make operation more difficult, and turn out poor quality work.

The year's accumulation of dirt and chaff tends to collect moisture and makes for ideal conditions for rust and corrosion. Grease collects dust and grit. This accumulation should be removed.

There are several things to be done in the cleaning process. Use a brush or knife to remove the thicker accumulations. If compressed air is available, some of the loose dirt and chaff can be blown out. Be sure to get into the corners and hard-to-get-at places. The dirt and grease left after scraping can be removed by washing with kerosene, gasoline or a good detergent. A detergent is a liquid which can be applied by brush or by spraying. This material can be obtained at most paint stores. Leave it on according to directions, probably 10 or 15 minutes, then wash or hose it off. You'll be surprised at what comes off in the process. The metal parts look almost like new.

The inside of combines and grain separators should be cleaned as well as the outside. An easy method is to run a couple of bushels of broken corn cobs or chopped stalks through the machine with all cleaning doors or gates open. The corn cobs or stalks should be about one inch in length.

Check all painted surfaces for spots where the paint has either flaked off or has been worn off. Touch up these spots with a new coat. If the paint is badly checked

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Lincoln, Nebraska, October 6, 1951

it will pay to do a complete repaint job. Cover all shafting, chains, gears, bearings, and unprotected metal surfaces with a rust preventative. Heavy grease or oil can be used but their protection is limited to perhaps three months. These rust preventatives are a grease or liquid to which has been added a chemical that prevents metal from rusting. They can be brushed on or the lighter grades can be sprayed, and will give protection for 9 months to a year, or longer. Your oil dealer can supply this material.

While you are taking care of the metal parts of your machinery, don't forget the wooden parts. Wood takes up moisture from rain, snow, or dew, causing it to warp and often results in misalignment, heavy draft, binding, or breakage. So use a good paint or linseed oil preparation.

Remove canvasses and belts from machinery and store in a cool dry place where mice and rats can't get to them.

Take machinery off its tires or vice versa. If the tires have been used in spraying operations or on sprayed fields, wash them with soap and water. A detergent can be used to remove oil or grease. Machinery which must be left outdoors should be placed on blocks, and the tires stored in a cool, dry place or, if not removed, they should be covered with waterproof canvas to protect them from the sunlight.

Special care is needed to prepare the tractor and other farm motors for periods of non-use. Drain the crankcase and refill with fresh oil. Service the filter and air cleaner. Then clean the spark plugs and put approximately two tablespoons oil (same grade as used in crankcase) in each cylinder. Turn the motor over several times to give the cylinder walls a thin coating of oil. Replace plugs. Drain fuel tanks, sediment bulb, and carburetor.

Gasoline left standing for any length of time tends to degenerate and forms a gum which will clog fuel lines and carburetor jets. (If gum deposit does form, it can be dissolved with one part gasoline and one part benzol, or with acetone.) Drain radiator and flush with clean water, washing out dirt and rust accumulations to prevent their hardening and forming deposits. Leave drain plugs out. Tie the drain plug to the steering wheel to remind the operator to put water in the radiator before running the tractor. Remove the storage battery, charge, and store indoors. Plug the exhaust pipe to prevent moisture entering the engine and rusting the valves.

During the above processes, check for worn and broken parts, anything which needs repair or

replacement. Use shipping tags (tied to machine) to jog your memory for winter repair work or purchases.

As most farmers use their tractor the year round, it might be well to include some tips on getting them ready for winter operation.

Use high quality motor oil of recommended grade. One that will flow freely at extremely low temperatures. 10W and 20W designate winter oils.

Change oil when motor is hot.

Be sure valves are well lubricated so as to prevent cold corrosion and valve sticking.

Change to winter weight transmission lubricant. A lighter viscosity of lubricant can be obtained by diluting the heavy summer oil with 10 to 15% kerosene. (Caution: Dangerous to use volatile type power fuel. Specifying kerosene avoids this hazard.) Lighter oil should be used in the transmission even if the tractor is used only a little for belt work.

Use a light grade of grease for lubricating those bearings that must be serviced with a grease gun.

Keep radiator curtain or shutter in working condition so that it can be used to maintain the motor at the proper operating temperature. This is 165 to 185 degrees Fahrenheit when burning gasoline, 190 to 200 degrees F. for the heavier fuels. If water is used in the radiator, it must be drained whenever the tractor is stopped. Be sure all drain plugs are open. The radiator should always be refilled immediately after the engine is started.

If a tractor is to be used rather frequently during cold weather much time and inconvenience will be saved by draining the cooling system, flushing and refilling with a good high temperature antifreeze.

Check thermostat to see that it operates correctly and that it has the proper temperature range.

Use a light 10W motor oil or a cream separator oil in the cup of the air cleaner.

See that the magneto gives a good hot spark. Spark plugs should be clean and the points have the proper gap. Dirt around the plugs can collect moisture and cause hard starting. Keep the wires in good shape and clean.

There will be less condensation if the fuel tanks are kept filled. Check sediment bowl for the presence of water every few days.

If liquid is used in the tires be sure that it is a calcium chloride solution of proper strength.

Keep battery fully charged and check water level regularly. Make sure that the battery cables are not worn out or badly corroded.

Long-Lived Cows—A Breed Asset

Condensed from The Ayrshire Digest

G. A. Bowling

YOUNG cows sustain a breed—but old cows improve it. For this reason almost every organization for pedigreeing dairy cattle now has some method of giving special recognition to older cows that have contributed something toward the improvement of the breed.

There is more than one way a cow can contribute to the improvement of the breed. We think first of the contribution of the Approved Dam, since, on the average, she does make a definite improvement from the standpoint of milk production. There are those cows that appear to transmit high butterfat percentage, and are highly regarded as breed improvers. There are those that are able to pass on to their progeny an excellence of type which makes them highly regarded for that characteristic. There are also those cows that wear to a ripe old age. Certainly this characteristic is inherited, and must be more generally appreciated if our herds are to make more rapid improvement.

We are generally correct in assuming that among our Ayrshire herds the cows of lower production performance are eliminated at an early age. This elimination leaves two classes of higher-producing cows—those that wear well and those that do not. There are several very good reasons, other than accidents, why many high-producing young cows are eliminated each year from herds. Among these are breeding troubles, udder infections, udders breaking down, bad feet and bad legs. There is plenty of evidence that bad feet and bad legs are inherited. There is some evidence that resistance to, or susceptibility to, mastitis may be due to inherited characteristics. It should not be necessary to point to the fact that characteristics relative to udder shape and attachments are definitely inherited. A tendency for poor breeding records appears to fall in the same category.

Accepting the fact that the above mentioned characteristics are inherited, then those cows, and those cow families, that do not show those undesirable characteristics, and do not succumb to these faults should be the most desirable cows of the breed. In

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Brandon, Vermont, August 1951

fact, on them and their sons and daughters rests our only real hope for breed expansion and breed improvement.

Studies have shown that about 20% of the heifers on Herd Test are never tested during a second lactation. Close to an additional 15% are never tested for a third lactation, and approximately an additional 10% are never tested for a fourth lactation. When one takes into consideration the sex ratio, calving intervals and calf losses, in addition to the female calves that are never registered, it can be appreciated that if we depended upon our young cows for herd replacements our breeds of pedigreed dairy cattle would never grow in numbers. Neither would there be appreciable gains in productive ability, if herd size were maintained. It is quite true that young cows only sustain a breed. Where, then, shall we look for our breed improvement and increases in numbers?

We must consider our older cows as the most dependable source of replacements for breed improvement and increases in numbers. This is true, not only for female replacements but also for our most dependable breeding bulls. We must appreciate more fully the value, to our breeding programs, of those older cows *just because they live longer.* By the time they are mature you have decided that those cows are profitable. After that it should be your aim to husband them carefully, and breed them to the best bulls available. From that group of mature cows should come a large percentage of Approved Dams. That group, also, should drop many of our best preferred pedigree bulls. In that group of mature cows are those that have the soundest feet, the strongest legs, the best attached udders, the best breeding records, and the most resistance to mastitis. They also possess the hardiness that helps avoid those various types of ailments that necessitate numerous veterinary fees, and cow losses that cut into dairy profits so heavily.

One of the prophets of the Old Testament said, "Old men have visions but young men dream dreams." The wisdom of that statement has been apparent to me many times, but never was it brought more to the point than in my own case when, at little more than half my present age, I was corresponding with the late A. H. Tryon, my predecessor at Strathglass Farm. Only a few years previous I had been placed in charge of the breeding program with the Reymann Memorial Ayrshires. Already I was dreaming of the day when, in our breed, we would have cows that would average 10,000 to 12,000 pounds of milk in 305 days as heifers on two milkings daily, and then go

on to a ripe old age—stepping up each year according to the conversion factors for mature equivalents. We were discussing the interpretation and use of records in a breeding program, and I learned more than I appreciated at that time.

Mr. Tryon pointed out to me that with the body size of our breed and its inheritance for production, we would have a more profitable cow if we would stress longevity rather than early performance in our Ayrshires. He named cow after cow that had been only fair producers as heifers, but matured into long-wearing cows that made enviable lifetime records. He also stressed the importance of the proper body conformation, the soundness of foot, leg and udder, and the dependability of the pedigree. It was never one of my dreams at that time that I would, one day, manage Strathglass Farm. Since I did succeed to Mr. Tyron's position after his death, however, I am glad he had the vision to lay the foundations properly for a breeding program that would tend to produce a longer-lived type of Ayrshire.

I am convinced that we should do everything we can to increase the percentage of mature cows in our herds. Such an increase will reduce costs of replacements, provide more surplus stock of higher quality for sale, give a greater choice in replacements and permit the development of a sounder breeding program. I am also convinced, however, that we must change our expectations in regard to our younger cows, and cooperate more closely with nature in the development of our young cows.

Scientists have shown that slow growth on the average means longer life. The heifer of proper conformation and dependable pedigree that starts out at a moderate level of production may wear longer, and during her lifetime will produce a greater total volume of milk than the heifer that matures quickly, but wears out quickly. I believe that the udder should mature with the cow, and should not be spoiled by overwork during the early lactations. Body and production should mature together. The seven thousand to eight thousand pound 2-year olds, if of proper conformation and correct pedigree, have a good chance of being the old cows of which one will be proud. Strathglass Lucky Puff, made only 8000 pounds as a two-year-old, yet she went on to become the long distance butterfat producer of the Ayrshire breed, with 189,846 pounds of milk and 7598 pounds of butterfat. Strathglass Brown Peg was a disappointing two-year-old, yet became a breed champion with 18,287 pounds of milk, 4.8 per cent, and 874 pounds of fat in

305 days, milked twice daily. The granddam of a present Strathglass herd sire produced only 7500 pounds as a 2-year-old, but made over 100,000 pounds in her lifetime, and made one record of over one thousand pounds of butterfat. These cows had the correct type, however, for each was classified 'Excellent,' and each had the right kind of pedigree.

Consider the 10 cows in our million pound herd of 1949. These long-wearing cows did not happen by chance. All of them were by proven sires. Four of them are by a sire whose dam had produced a total of 131,860 pounds of milk in 13 lactations in Scotland. Her sire, in turn, was out of a dam that had produced 125,123 pounds of milk. Four of the cows are out of dams that had produced over one hundred thousand pounds of milk, and they were approved by the Ayrshire Breeder's Association as outstanding brood cows. When one considers the fact that the average life of a dairy cow is about six years and that injuries and breeding troubles, as well as many types of infections, take a heavy toll; it is apparent that where there are dam and daughter combinations which have stood up under the onslaught of all of these destructive influences, they must possess some inherent superior qualities which, if husbanded properly, should give rise to a long-lived strain of cow.

While many of us have different problems related to our dairy farm and breeding programs, we all have to face production costs —which include replacement costs. The long-lived cow will help reduce those replacement costs, and her ability to work and wear is a breed asset.

It Takes More Than Money

Condensed from The Michigan Farmer

John Doneth
Michigan State College

TWENTY thousand dollars of investment per man—$265 investment per acre—that's what it takes to own and operate a farm today. At least, these were the average investment figures based on conservative present day values found on 826 Michigan

Reprinted by permission from The Michigan Farmer, Detroit, Michigan

farm-account farms in 1950. The investments include land, farm buildings, machinery, livestock, and feed.

The amount of money it takes to farm is not the same for all regions of Michigan. Upper peninsula and northern Michigan farms had relatively lower investments per acre and per man. However, these farms also averaged lower net earnings (labor income) for the 10-year period 1941–50. Southern and western Michigan farms had higher investments per acre and per man. In like manner, net earnings were also higher in these areas. The more specialized fruit farms had the highest investments per acre. However, the labor force was also the largest on these farms with the result that investments per man were generally low. Net earnings on fruit farms for the 10-year period were the highest of any region.

It appears that a man can get established in farming and even own his own farm with considerable less capital in the northern areas. However, on the average, net farm earnings are not as great and this is a serious limitation, especially when the annual income difference is multiplied by the lifetime of the farmer. Serious consideration might well be given by the starting farmer to renting a larger and more productive farm and investing his limited funds in machinery and livestock until he has built up a larger capital supply. Then, instead of buying a low-opportunity farm he might be in position to obtain a better located, more productive, and higher-earning place.

It must not be concluded though that having sufficient money to invest is the complete answer to successful farming. In fact when the successful farms in each region were grouped together and the unsuccessful ones similarly grouped some interesting ing results showed up. Investments per acre and per man were almost the same. Even expenses per man were nearly identical. The big dif-

INVESTMENT ON 826 MICHIGAN FARM ACCOUNT FARMS IN 1950

Farming Region	Investment per farm	Investment per tillable acre	Investment per man	*Labor income 1941-50
Upper peninsula farms	$20,696	$226	$14,126	$1,615
Northern Michigan farms ..	25,809	220	16,872	1,707
Southern Michigan farms .	45,346	286	25,945	2,897
Western Michigan dairy-poultry farms	34,022	279	21,264	2,553
Fruit farms	47,126	421	16,250	2,901

*Labor income is what the farmer has left for his labor and management after cash expenses, family labor, depreciation, and interest on investment are deducted from total income.

ference was that the gross income per man was over 50 per cent higher on the successful farms. The greatest difference of all was in the net farm earnings.

There were reasons for this. The successful operators were on larger farms and had more machinery in total. They obtained higher yields, used more fertilizer, kept more livestock and higher producing livestock. They did a better job of buying and selling. The result was that income per man and per $1000 invested on both machinery and buildings was considerably higher on the successful farms.

INVESTMENTS, EXPENSES, AND INCOME FROM FARMS IN 1950

Item	Unsuccessful Farms	Successful Farms
Total investments, per farm	$30,583	$39,881
Investment per tillable acre	268	264
Investment per man	19,300	21,700
Total expenses per man	4,052	4,133
Gross income per man	4,049	6,258
Labor income for the farm	249	4,130

Green Revolution

Condensed from Soil Conservation

Hugh Bennett
Chief, U. S. Soil Conservation Service

Soil conservation is turning the United States green. Green pastures, green woodlands, and green landscapes are covering up millions of acres where, a few years ago, little or nothing was produced, where erosion was severe and fields were bleak and gullied.

Look at the South: its progress toward a well-balanced, sustained, and profitable agriculture! Pastures are being developed on a rapidly expanding scale. Pine woodlands are being protected from fires and excessive grazing. The land is being used for what it is best suited to produce, and safeguarded from erosion.

This revolution on the land began with the establishment of the conservation program in the early thirties. There was agricultural improvement before that epochal date, to be sure, but it was more or less of a local nature and to a large degree overlooked sound land use. The discovery that pine trees were a merchantable crop helped some sections to get

Reprinted by permission from Soil Conservation,
Washington, D. C., October 1951

started. But it was the conservation program—good land use and protection of the land from erosion—that really brought on the revolution. This paid the highest dividends southern farmers had ever known. And it has been much that way throughout the country.

In the South, grass, milk, beef, pine trees, and good land use and protection made up the pattern of revival. Southerners were the first in the Nation to try to halt the destructive inroads of erosion, but the one-practice system they started out with—hillside ditching—back in the early 1800's, was the wrong system, although temporarily helpful on some farms. Those early attempts at soil and water conservation were quite generally restricted to terracing. There was little thought of land use. Vast forests of pine and mixed pine and hardwoods were cleared without regard for the suitability of the land for cultivation. Literally millions of acres of fine woodlands were stripped of magnificent stands of pine and hardwoods on slopes too steep for cultivation of any kind. These lands were not long going to waste by way of rapid erosion. Not only was the land ruined for cultivation but vast quantities of valuable timber were wasted.

From the beginning, the Soil Conservation Service based its work on using the land as nature made it (that is, according to its capability), and protecting it from the ills of erosion, waterlogging, and other deficiencies resulting from man's careless use. When the job is completed—it could be completed, and ought to be, in about 20 years—our agriculture at last will be on a sound, stabilized, and orderly basis.

With the initial program completed, the task will be to give diligent attention to maintenance and improvement. If better varieties are discovered, or better methods of fertilization or cultivation—whatever the advances in science or technology — farmers and ranchers will be entitled to the fullest possible advantage.

In May 1951 I made a trip of inspection through the Southeast —across Virginia, the Carolinas, Georgia, Alabama, Mississippi, and Tennessee—to see just what was taking place out on the land. For many years I have been intimately acquainted with the region, having visited every county of the seven States—studying the land and its needs. I have lived with its agriculture and kept close scrutiny on its progress, or lack of progress, since the first of July 1903, when I began work in the old Bureau of Soils, classifying soils and studying local and regional land conditions. I witnessed the harvesting of the South's vast forests and the use, or misuse, of the lands that were brought under

the plow as the result of the stupendous lumbering operations.

I vividly recall the old-fashioned log-rolling jamborees and the wholesale clearing of millions of acres that were put into cultivation more or less without regard to the adaptability of the land. And I witnessed, too, the burning of vast quantities of valuable timber cut down in these clearing operations in order to have "new ground" to replace the erosion-impoverished fields that had been brought to the lowly level of producing "bumble-bee cotton" and "7-bushels-per-acre corn."

On the soil survey I sometimes worked a little late during winter and spring just to see the nightly spectacle of girdled trees—often fine longleaf pine—purposefully burned to get them "out of the way" of plowing. The fires were most spectacular on dark nights. Along the entire length of these dried-out girdled trees, still standing, one saw intermittent brilliant flares as blazing broke out from extra-resinous spots in the wood. These could be seen at intervals from the ground up to 40, 50, and 60 feet above the ground. Now and then the whole burning upper part of a tree would come tumbling down in a spectacular burst of sparks. With February and March winds, these burning areas were unsafe to drive through, so that we sometimes had to look for overnight accommodations at a neighboring farmhouse.

Sawmills of those early days were big mills for the most part. Small, portable outfits had not come in to any great extent. Small operators were generally unable to sell boards and cross ties for a worth-while profit.

And, too, I became painfully familiar with the widespread impoverishment resulting from sheet washing as well as devastating gullying. Some of the erosion effects we ran into were astonishing indeed. They made me wonder about the economies and agricultural teaching of those days.

In 1910, when we were making a soil survey of Lauderdale County, Miss., we were astounded to find, while traversing the main highway leading south from Meridian, along the crest of one of the highest ridges in the county several places where gullies, ascending the slopes from opposite directions, had cut into one another across the crest of the ridge to such depth that bridges had to be built to keep the road open for traffic. The gullies, of course, had not cut out their deep channels by any process of water running uphill; they simply had extended their channeling upslope by the cutting effects of water running in at the upper ends. In this manner, the cutting beginning on lower slopes gradually worked up to

the crest of the divide from both sides of the road, where the two incisions joined.

These items I have set down in order to develop something of a basic perspective of what was going on in much of the Southeast, and other parts of the country, around a half-century ago—vast soil and water losses, timber wastage, slopes that were gullied, bare, brown, and bleak from October to April!

In this recent trip I saw, for example, pine forests, in solid stretches of beautifully growing green trees, sometimes 10 miles across, where, in the old cotton belt of central Georgia, I had seen, before the boll-weevil exodus of the farm population, cotton-fields and cornfields in almost endless array.

I saw, also, in every State, a large increase in pastures—good pastures, with good stands of adaptable grasses. These I saw on the sandy lands of the coastal plains country, on the Piedmont clay lands, in stream bottoms, and throughout the Alabama-Mississippi Black Belt. It was springtime; the pastures—every one of them—were carpeted with the greenest of grasses, often mixed with white clover in sparkling blossom. Both beef and dairy cattle were of good breeds and grades, and everywhere were reported as money makers.

A matter that seemed of much importance was the way the livestock is spreading all through the South, even in the sand hills, an area which a couple of decades ago was generally considered too poor for grass. We now have adaptable grasses for nearly every part of the country. The story of what the Service has done in ascertaining the grass needs of the various parts of the Nation and in developing seed supplies to help meet these needs reads like a miracle.

The Soil Erosion Service (trail blazer of the Soil Conservation Service) started work in September 1933 during the great drought. Early in its life, the Service came to a critical period when it desperately needed better grasses to combat dust storms that were afflicting millions of acres in the Great Plains. It soon developed that we not only didn't know very much about what grasses were particularly suited to the various problem areas of the country, but there was no seed supply of a great number of native grasses. Accordingly, when the Service was moved from Interior to Agriculture, there came the opportunity for it to do something about the matter. Something was done—quite promptly.

I was told in my first Department of Agriculture interview as Chief of the Soil Conservation Service that the new soil conservation nurseries were to be oper-

ated by us. Here was the golden opportunity. I gave immediate instructions to our nurserymen to go out along the highways and by-ways and bring into the conservation nurseries every native grass and legume, together with all strains and varieties thereof, which showed any promise of fitting usefully into any particular niche of the Nation as a good or better pasture or ranch grass, or as a worth-while soil-saver. This was done all over the country, and eventually something over 40 grasses and legumes were domesticated and put to use in the control of erosion by both wind and water. Among the most outstanding and extensively used are the 22 included in table 1, where also are shown the results of 1 year's collection of seed attributed to the efforts of the Service.

TABLE 1.—*Twenty-two native grasses now in extensive use, whose domestication was attributable directly to nursery observational studies of the Soil Conservation Service, together with quantities of seed harvested in 1950*

Name	Seed Harvested 1950 as result of SCS efforts
	Pounds
Sherman big bluegrass	101,000
Bromar mountain brome	215,000
Cucamonga brome	5,500
Beardless wheatgrass Whitmar beardless wheatgrass	16,000
Primar slender wheatgrass	114,000
Western wheatgrass	33,000
Elreno side-oats grama Vaughn side-oats grama	403,000
Blue grama	401,000
Slender grama	13,000
Blackwell switchgrass	16,000
Sand lovegrass	618,000
Purple needlegrass Green needlegrass	6,000
Big bluestem	263,000
Little bluestem	1,381,000
Sand bluestem	22,000
Buffalograss (burs)	16,000
Yellow Indiangrass	368,000
Indian ricegrass	1,000
Sand dropseed	350
Total	3,992,850

At the time this observational work was started in the nurseries, the grasses listed here were not quoted for sale in any seed catalogs we could get our hands on. In the instance of western wheatgrass, for example, I heard a prominent seed dealer say that when the Soil Conservation Service began this work he was sure that no one could have bought a spoonful of this seed in any seed house.

"Now," he said, "I can supply western wheatgrass seed in carload lots."

We had much the same experience with the other natives listed, and still additional ones are under observation. Some of these have come into such common usage that the trade pretty well takes care of the supply, without Service assistance.

The Service has had a hand in spreading the use of the more promising of the introduced grasses, together with several new strains of these found by our nursery personnel, to adaptable areas in nearly all parts of the country. Many of those which farmers had successfully used here and there have been spread widely to adaptable areas.

Take, for example, Suiter's grass (called tall fescue or Kentucky fescue): A hundred pounds of seed of this were bought in 1941 by the Soil Conservation Service from the Suiter farm in eastern Kentucky and increased in quantity on our nursery at Chapel Hill, N. C., sufficient to supply seed enough to soil conservation districts in the Southeastern States to plant one or more 5-acre seed-increase plots in 686 counties. From this, Suiter's grass has spread well across the Southeast and far beyond on a tremendous area found to be well suited to this splendid grass, which remains green and palatable deep into winter. When I was in Texas in March, this year, I saw a large planting of Suiter's grass in the coastal prairies section west of Houston, where I saw, also, some 400 visiting Canadian geese grazing on this grass.

Similarly, the Service has spread the wild winter pea for winter grazing over the Alabama-Mississippi Black Belt and widely into adjacent areas. Blue lupine, an importation, scarcely used 10 years ago, now is on hundreds of thousands of acres as a green-manuring and soil-holding crop, principally on peanut land. This was started by the Soil Conservation Service with a few pounds of seed obtained from the Florida Agricultural Experiment Station, where there was a small station-produced supply.

During my recent trip in the Southeast, I saw, in one continuous body, near Montgomery, Ala., 90,000 acres of black-belt upland planted to pasture grasses (mainly Dallis and White Dutch clover, with an overseeding of Caley-pea in many places for winter and spring grazing). Again, I saw the same thing on 150,000 acres in the black-belt section, near Demopolis and Greensboro, Ala. All these pastures were being used for beef and dairy purposes. Most of the animals were pure-breds or high-grade cattle. *The 150,000 acres of land was practically a continuous block of pasture.* Most of it had been eroded under cotton and corn to such an extent that the original black topsoil had been stripped off, down to a yellowish-brown, limy clay subsoil. Previously, I had seen all of this land in cotton and corn, and had mapped a good deal of it while doing soil-survey work.

Probably this wholesale change from cotton and corn to grass had never been equaled anywhere else on earth. I think it undoubtedly represents the world's best and biggest example of a complete, quick transformation from one set type of agriculture to a distinctly different and much better type of agriculture. The Soil Conservation Service, working with farmers, planned most of this, farm by farm. Some of it was the result of

the spread of practices from the original work of the Service.

Of the nearly 19 million acres of improved pasture in the United States, for which plans were made by the Service, the 13 Southern States (where the work consisted largely of establishing new pastures) have developed nearly 12 million acres, or 63 per cent of the total. Of the 48 million acres of range improvement, the 13 Southern States accounted for 37 per cent.

This is part of the story of the Green Revolution — principally what it is doing for the country and how it came about.

Grub Out Buckthorn

Condensed from Farm Journal

C. R. Elder

DESTROY the buckthorn on your farm this winter, and you'll harvest more oats next summer.

That's the latest word from scientists who are working to develop varieties of oats that resist crown rust.

Right now crown rust is the worst oat disease in this country. It cut Iowa yields 15% to 20% this year.

What's the connection between buckthorn bushes and crown rust? Just this: buckthorn serves as an alternate host for crown rust of oats in the northern half of the country, the same as barberry does for stem rusts of *all small grains.*

In the spring, crown rust lives on buckthorn leaves for a few days before it moves into the oats. Scientists have known this for more than 50 years; have also known that the 101 races or "families" of crown rust mate and multiply on buckthorn. *Sometimes they cross-breed and produce a new race of rust.*

This is serious, because varieties of oats that are resistant to the old races may prove to be highly susceptible to this new hybrid offspring.

Why didn't we start destroying buckthorn years ago?

The truth is that back in the twenties plant pathologists fought to have buckthorn included in the

Reprinted by permission from the Farm Journal, Philadelphia, Pennsylvania, October 1951

bill that outlawed barberry. But opposition was stiff, and the scientists soon realized that if they included both barberry and buckthorn in the same bill, it might never pass. So they settled for barberry, since it harbors stem rust, which attacks *all* small grains. (Crown rust attacks only oats.)

Meanwhile, back in 1940, oat breeders licked the crown rust problem temporarily when they released the Victoria-Richland crosses. These varieties (Tama, Boone, Vicland, etc.) *were highly resistant to the 33 races of crown rust and the prevalent races of stem rust.*

Yields sky-rocketed, and five years later 75% of all the oats grown in this country were Victoria derivatives.

Then disaster struck. In 1945, Frances Meehan, a plant pathologist at Iowa State College, noticed an unusual Helminthosporium on oats sent in for testing. She showed it to Dr. H. C. Murphy, who heads up the USDA's program to develop rust-resistant oats.

Murphy tested it against all the Victoria derivatives that farmers were growing in 1945. It killed every one of them! Within a year, Helminthosporium blight was cutting oat yields 25%.

But the plant breeders had another family of oats—the Bond derivatives—that resisted the devastating Helminthosporium. There was only one catch: *these Bond derivatives were quite susceptible to certain races of crown rust.*

Scientists tried to breed a new variety that was resistant to *both* Helminthosporium and crown rust, but Nature refused to co-operate. The same hereditary factor that carried the Victoria resistance to crown rust also carried susceptibility to Helminthosporium. They couldn't separate the two!

So the scientists decided to release the Helminthosporium-resistant Bond derivatives, and in 1946 you started to plant Clinton, Benton, Cherokee, Mohawk, Bonda, Shelby, Zephyr, etc.

Since that time, races 45, 57, and 68 of crown rust—relatively rare in 1946—have increased as expected.

Now, will we eliminate crown rust entirely if we get rid of buckthorn? Unfortunately, the answer is no. Reason is that crown rust spores migrate—blow South in the fall and winter there, just as stem rust spores do.

In the spring, the crown rust spores *may* travel back North. *In 1951, they did not.* Yet, crown rust destroyed a fifth of Iowa's oat crop. *This proved for the first time what the scientists had feared—that buckthorn alone can produce —and spread—enough crown rust*

to make their removal necessary.

Naturally, the plant breeders wish now that they had started eradicating buckthorn 30 years ago.

But that's no reason to put the job off any longer. In Iowa, W. H. Bragonier, Iowa College Botany Department head, is spear-heading the eradication drive. Other northern states will likely follow suit, since there are rust-producing types of buckthorn growing in every state.

However, in parts of the South, where the winters are extremely mild, crown rust can survive without buckthorn—winters on the oat plants. "Destroying the buckthorn in these areas probably wouldn't do much to lessen the damage from crown rust," explains Dr. Murphy.

Most of the buckthorns are handsome shrubs with bright green leaves, greenish flowers, and black berries. They grow well in the shade. European buckthorn (*Rhamnus cathartica*) above, is being sold as a hedge plant.

Certain wild kinds spread rust too (mainly *lanceolata, alnifolia,* and *caroliniana*). Look for them in fence rows, in groves, along creeks.

Some kinds of buckthorn *do not* spread rust. Ask your County Agent to identify any suspicious bushes. Or send a branch to your State College.

Giant Foxtail Control

A growing weed menace, particularly in east-central Illinois, is giant foxtail. It is a difficult problem in cornfields, soybeans, and in small grains with legume seedings. Corn and beans that appear clean at last cultivation may become heavily infested in late summer.

If giant foxtail has been kept down in corn, an application of 1 to 1½ pounds of 2,4-D can be used in place of or following the third cultivation to prevent emergence in late summer, according to F. W. Slife, University of Illinois agronomist. The 2,4-D should be applied with sprayers with drops on the booms to keep the chemical off the corn. The 2,4-D treatment cannot be used on soybeans.

Clipping at frequent enough intervals to reduce materially the seed production of foxtail in small grain stubble will endanger the legume seeding.

—*Cappers Farmer*

When To Hire, When To Buy

Condensed from Agricultural Situation

G. E. Frick and S. B. Weeks
Bureau of Agricultural Economics

On the farm, you don't always come out ahead by owning and using every machine you need. Although to own certain machines may be vital to your success as a farmer, you probably know of other cases where it's cheaper to hire the work done on a custom basis.

With some machines on some farms, the advantages of the one type of service over the other are crystal clear. Even so, it is a good thing to compare the costs of the two with some exactness. This is especially desirable in the great number of cases where exactness of figures can mean the difference between a decision to buy a new machine, or to hire the work done. Our research has developed some facts which can help you work out your own comparison of these costs.

The information here is based on Research and Marketing Act studies made by the Bureau of Agricultural Economics, U. S. Department of Agriculture and the Agricultural Experiment Stations of Connecticut and New Hampshire.

First of all, it will usually pay you to hire machine work done, if you can get it done satisfactorily for no more than your real costs would be if you used your own machine and labor. If the costs of the two methods are about equal, and if the hired machine service is good, it's generally better to hire the work done. Of course, if hiring the job done would result in idleness for your necessary farm workers, this would modify the picture somewhat. But on a straight "break even" basis, there's no advantage in buying the machine. So why do it?

Furthermore, you may prefer to hire a job done even if it costs a little more than doing it with your own equipment. Owning a machine means that you have money tied up—money for which you may have many other uses. On the other hand, of course, is the fact that if you hire work done, the custom operator may not be able to do it at exactly the right time. These two points tend to offset each other but both should be considered in making

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your decision.

To figure your own "break even" point for any machine is not too hard. To do this, first figure all the costs that you would have in owning and operating your own machine. Work out all costs on an hourly basis, your own as well as the rate charged by the custom operator.

Add up the direct costs per hour of operating your own machine — the costs of fuel, oil, grease, twine for a baler, spray material for a sprayer, etc. Then compute the annual fixed costs of owning the machine.

To illustrate this procedure, let us suppose you have plowing to do. For this work your costs for fuel, oil, and grease, let us say, figures out at around 45 cents per hour. Then add the value of the labor you would use if you operated your own machine—say $1 per hour. This gives a total of $1.45 per hour as your costs for labor and machine operation if you do the work with your own machine.

Custom prices for plowing differ from area to area. But the custom rate,—let us assume, is $3.50 per hour in your neighborhood. This would be $2.05 per hour more than your own direct operating costs and labor charge —an apparent saving of $2.05 per hour by using your own machine. But don't stop there. You haven't figured all your costs.

Look now at the fixed costs of owning the particular machine. These are the yearly charges for depreciation, interest on your investment, housing for the machine, insurance, and taxes. It's best to work these out as exactly as possible. However, rule of thumb estimates would allow 10 to 15 percent of the purchase price of the machine to cover these costs each year. The lower percentage allowance would be for one of the slower and relatively simple machines.

For the particular plowing equipment under consideration, let us say that you figure these costs amount to $26 per year. At this point, you are ready to make a decision as to the wisdom of buying a machine or hiring the work done by others. You have only to ask yourself one question. Will you be able to use the machine for enough hours during the course of a year so that your apparent savings of $2.05 per hour will actually cover the $26 annual cost?

In the example above, you would have to have 12.7 hours of work for the machine to do each year, just in order to reach the "break even" point. That's the figure you get through dividing $26 by $2.05.

New Approach To Calf Nutrition

Condensed from Guernsey Breeders' Journal

C. W. Lindow, W. L. Brickson
C. M. McCrary, Kellogg Company, Michigan
Professor E. B. Hart, Univ. of Wisconsin
Dr. C. F. Huffman, Michigan State College

APPROXIMATELY five million heifer calves and 250,000 bull calves are raised every year in the United States for replacements in dairy herds. In other words, about 20 per cent of the dairy farmer's herd must be replaced annually. Most farmers know that the introduction of purchased animals to their herds is both costly and dangerous due to the high probability of introduction of disease. Therefore, raising these replacements is almost a must for the successful dairy farmer.

The old traditional method of raising dairy calves as recommended by most authorities consists of feeding whole milk for thirty days and then skim milk for the next six months. With such a program the average calf would consume about 200 pounds of whole milk and 2,000 pounds of skim milk—competing for these dairy products with humans, since today more than 25 per cent of the national diet consists of dairy products.

Although about 70 per cent of dairy farmers use the milk program outlined above in raising calves, the cost of milk products has increased to such an extent in recent years that many dairymen are now making extensive use of calf meals and pellets in their feeding programs.

Proper nutrition of the calf is of critical importance to the dairy industry. Unfortunately, there is a paucity of data pertaining to the requirements of the calf.

Recently, investigators have focused attention on the importance of the relation between the anatomy of a calf and the way it is fed. For instance, Dr. C. F. Huffman states that "They (ruminants) start out at birth with a digestive tract similar to that of a pig; that is, only one functional stomach. The pail-fed calf frequently takes large swallows which exert enough pressure to force the milk through the lips of a groove (esophageal) into the undeveloped rumen. It is believed that the milk in the calf's rumen

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Peterborough, N. H., August 15, 1951

undergoes putrefaction which sometimes results in calf scours." The same author also stresses the significance of intestinal micro-organisms in relation to the nutritional status of ruminants, and the significance of the type of carbohydrates in the early nutrition of the calf, while other investigators have inoculated calves with the cuds of adult cows to furnish a culture of the organisms deemed most desirable in the digestive tract of calves. This innovation in calf raising has received considerable attention recently. However, we feel that cud inoculation although perhaps of value, is no panacea for all the ills of the baby calf.

Undoubtedly, many factors determine whether a calf survives or dies. Dr. R. M. Bethke, formerly Chairman of the Department of Animal Science, Ohio Agricultural Experimental Station, states that out of every five calves born in the United States, one will die before reaching the age of six months. We believe that this high death rate is due largely to improper feeding methods, coupled with disease. Under the usual farm conditions, the calf's stomach is overloaded twice a day with milk or gruel, leading to a high incidence of indigestion and white scours—probably the worst scourges of the dairyman.

It is known that calves running with hard-to-milk cows are less apt to develop white scours than those which are hand-fed or with nurse cows that milk freely. An investigator reporting in a recent issue of the Journal of the American Veterinary Medical Association postulates that the calf which is nursing properly salivates freely and that the saliva forms 10 to 15 per cent of the food swallowed, producing a light, frothy, easily digested curd. On the other hand, a pail-fed calf swallows its milk quickly and gets very little saliva mixed with it. Although other factors may be associated with the incidence of scours in calves, the authors believe that improper feeding methods lay the foundation for the most serious ailment of the baby calf. Evidence gathered over a long period of time indicates that a healthy calf at birth which is then fed properly has a far better than 80 per cent chance to live to six months of age.

Today many human infants are reared successfully on synthetic diets. Pediatricians are relying more and more on specially prepared baby foods which give the non-breast fed infant a better chance to survive. Realizing that the baby calf's feeding problem during its first few weeks of life is analagous to that of the human infant, the authors deemed it advisable to review the nutritional

status of the calf in the light of the most recent advances in the science of nutrition and to lay a foundation for a better knowledge of the basic requirements of the calf during this inital growing period. Since raw foods in general are not readily assimilated by young animals, it was decided to use processed cereals in place of raw grains. This constituted a radical departure from the standard procedure of raising calves. At the same time, it was considered necessary to balance the nutritents so that the food would contain substantially the same food values that are present in milk. Thus, in the light of this new approach to the problem of proper calf nutrition, a new food was formulated and balanced to approximate closely the food values furnished by the calves natural food—milk, and it also possessed the palatability and digestibility of milk. Since the high fat content of some milk would have a tendency to promote intestinal upsets and furthermore, since fat is an economically expensive ingredient for animal feed, it was decided to ascertain whether processed cereals would meet the energy requirements of the calf. Numerous experiments have proved that this theory is sound.

A calf on a milk diet consuming six pounds of milk daily would obtain the following nutrients in highly available forms:

Nutrients Contained in Six Pounds of Whole Milk

*Fat	90 grams
*Carbohydrates	126 grams
Protein	84 grams
Ash	18 grams
Vitamin A	7,500 I .U.
Vitamin D	40-80 I. U.

*Calories from Fat & Carbohydrates = 1314

Since average milk contains about 13 per cent of dry matter, one pound of dry food should be roughly equivalent to six pounds of milk in over-all food value. After much experimental work a calf food was designed so that one pound would furnish the equivalent food value of six pounds of milk, i.e., a calf eating a single pound of the new dry food would obtain the following nutrients:

Nutrients Contained in One Pound of Calf Food

*Fat	15 grams
*Carbohydrates	270 grams
Protein	83 grams
Ash	29 grams
Vitamin A	10.000 I. U.
Vitamin D	2,000 I. U. **

*Calories from Fat and Carbohydrates = 1215
** Increased to prevent any possibility of rickets.

The above tables show the close parallelism obtained between the new calf food and milk. To obtain this high palatability and digestibility, the following feed ingredients were used: Condensed Whey, Specially Processed Cereals, Expeller Type Oil Meals, Dried Brewers' Yeast, Steamed Bone Meal and Vitamins. The quantitative chemical analysis of the food is shown in Table I.

Chemical determinations were

extremely useful in preparing this food as planned but the major tests were always biological. The successful rearing of the new-born calf was the final proof of the nutritional efficiency of this calf food.

Since the conception of this new approach to calf nutrition, hundreds of calves have been reared on restricted milk programs.

Since the major part of this

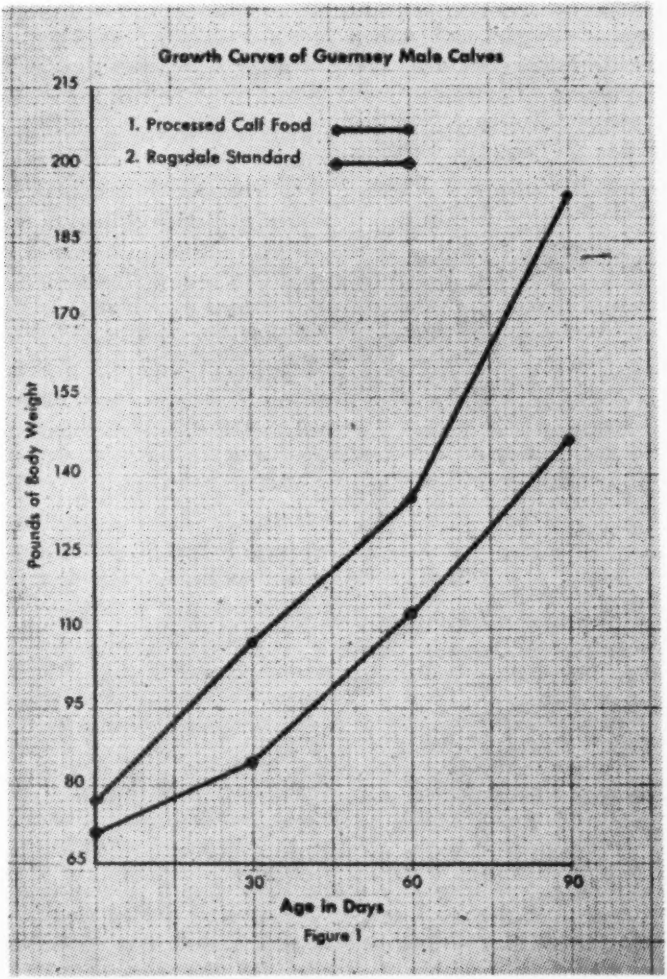

Figure 1

work was accomplished through the use of Guernsey calves, we have shown in graph form (Figure 1) the average growth curve of all males calves raised to three months of age this year, and on the same graph, as a means of comparison, the growth curve of the Guernsey male calf taken from the Ragsdale standard. The rate of gain for Guernsey male calves ranged between 0.9 to 1.6 pounds per day, or an average rate of gain of 1.3 pounds per day for a ninety day period.

TABLE I
Composition of Calf Food

Protein		18.5%
Fat		3.5%
Fiber		3.0%
Ash		6.4%
Moisture		9.4%
N. F. E.	Lactose	10.5%
	Processed Carbohydrates	49.1%
Vitamin A		10,000 I. U./lb
Vitamin D		2,000 I. U./lb
Vitamin B_1		2.5 mg/lb
Vitamin B_2		2.5 mg/lb
Niacin		20.0 mg/lb
Calcium Pantothenate		0.010 mg/lb
Iron		0.03%
Copper		0.005%
Calcium		1.0%
Phosphorus		1.0%

Some of the heifers raised as calves on this new calf food have themselves dropped healthy, normal calves thereby carrying on into the second generation.

This new approach to calf feeding offers advantages other than the saving involved in lowered cost of rearing a calf. The hidden savings not so apparent, involve reduced labor and veterinary costs, along with increased profits due to low mortality. Moreover, the transmission of disease within the herd is lessened by eliminating the need of purchased animals and by eliminating the use of a composite —non-pasteurized milk supply from the entire herd. The older method of feeding involved excessive labor and the trend today is more and more to let the calf feed itself so far as possible.

It is apparent that excellent calves may be reared easily and economically with a new program involving the use of a processed calf food. Although most of the calves received colostrum milk for the first three days and whole milk for an additional 7 to 12 days, some excellent animals were reared with the colostrum for only three days and an addition of whole milk for two more days after which they received no food except the processed calf food together with good legume hay and water. The calves reared on such a feeding program made rapid gains, were vigorous and thrifty, and developed into large heifers with the potential capacity for good milk production. They were free from scours and pneumonia, the common calfhood ills. Calves quickly accept the new processed food, since it has natural appetite appeal. Furthermore, these experiments prove conclusively that properly prepared carbohydrates may be substituted for fat in a large measure as a source of energy for the growing calf. It is

also apparent that the addition of whey, with its high content of lactose, as a major ingredient of this new type of calf food is instrumental in establishing a healthy flora in the intestinal tract. A feeding program comprised of processed food, good legume hay and water will produce excellent calves.

Seed Wheat by Thermometer!

Off-hand, you'd think that a wheat kernel would prefer to be seeded in a nice warm soil.

Not so, say scientists at Colorado A & M College. You'll harvest more bushels if you postpone fall seeding until the soil is definitely on the cool side—65° or less.

Reason is that root-rots like the soil warm. When it goes above 65° (especially 75° to 90°), they go to work on the seeds as soon as they sprout. Most of the plants that get above ground have puny, diseased roots.

Wheat seeded in a warm soil comes up quicker, of course, and usually makes more fall growth. But rank growth and diseased roots are a deadly combination if you have a moderately dry fall. The puny roots aren't able to round up enough moisture, and you lose the stand to what growers call "winter drying."

On the other hand, cool soil not only keeps the root-rots in check, but grows shorter plants that need less fall moisture.

Scientists suggest that you take the temperature of the soil three inches below the surface at 3 o'clock each afternoon from early September on. Any dial-type thermometer will work. You can also use a steel-tipped meat thermometer if you have one that registers low enough.

As soon as the temperature lowers to 65° and remains there for a few days, it's time to start seeding. If you're troubled with Hessian fly, postpone seeding until the fly-free date. Treat the seed with Ceresan M to control common stinking smut.

Ideal time for seeding usually lasts from 4 to 5 days. Wheat seeded too late won't tiller properly, and doesn't become as well established as seedings made 7 to 10 days earlier.

—Farm Journal

Putting the Heat on Piping

Condensed from Electricity On The Farm

ONE of the troubles with a frozen water pipe is that it develops during cold weather. That usually means frozen ground with snow underfoot. And there is certainly little pleasure to be found in trying to thaw out a pipe when temperatures are low, tempers are short, and numbed hands lose their grip.

If water pipes have to freeze up, wouldn't if be wonderful if it would happen during the summer? Then we could let the sun take care of it. But for you who wish to keep the water running this winter, there is a more practical solution. It lies in the proper application of heating tapes and cable. Several types of these lineal heaters are readily available. They vary in length, outer covering, heating element and wattage.

Lead covered heating cables consist of a resistance (heating) wire wrapped with a felted asbestos insulation which, in turn, is encased in a lead sheath. This type of cable is normally used in 60 foot lengths on 115 Volt current. It is rated at approximately 7½ Watts per foot. This cable *must be used in minimum lengths of 60 feet.* However, it is possible to cut the 60 foot cable into shorter pieces, such as six 10 foot lengths, as long as the total of 60 feet of cable are used in the circuit.

Plastic covered heating cable and tapes, consist of a resistance wire enclosed in a thermo-plastic casing. These come in varying lengths, the different types of which may be rated from 2½ to 7 Watts per foot. This type of heating cable is supplied with a plug attached to one end so that it may be plugged directly into a convenient outlet. Various lengths from 6 feet up, may be obtained. One of these plastic cables has a fusible heating element. In the event of damage to this cable, the heating element would melt, stopping the flow of current.

Any of these various types of lineal heaters may be used to protect exposed water pipes from freezing. Where pipes cannot be buried at sufficient depth to prevent freeze-up, the cable may be laid in the ground with them. The amount of cable needed will vary with the type of cable used and the temperatures at which it must protect the pipe. The following table can be used as a

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New York City, New York, October 1951

guide in planning the amount of cable required. This is based on an uninsulated installation on ¾" pipe in still air.

Temperatures Ranging Down To:	Watts Required Per Foot of Pipe
30	1
20	4
10	7
0	9½
-10	12¾
-20	15¾
-30	18½
-40	21½

The use of insulation to enclose the pipe and heating cable, reduces both the wattage requirement and the cost of operation. The insulation may take the form of a wrap-on tape or lengths of cellular asbestos insulation, such as is commonly used on heating pipes. Wherever insulation is used, it should be extended over the entire system. It should be protected so that water will not enter and lower its insulating value. If the heating cable is installed for automatic operation, taking its control from a thermostat, the thermostat bulb should have the same insulation given the pipe and heating cable. This insures the temperature which activates the thermostat, being the same as that to which the pipes are exposed. The thermostat bulb must not be directly in contact with the heating cable.

For installation in the higher range of temperatures, it is possible to run the lineal heater straight along the pipe to be protected and fasten it in place with friction tape. Where lower temperatures are encountered, it may be run down one side of the pipe and back up the other. Or you may spiral the heater along the pipe. The closeness of the spirals will be determined by the wattage of the heater and the heat required per foot of pipe. These heaters should not cross over themselves at any point. If it is absolutely necessary to make an installation where the heater crosses itself, separate the strand at the point where it crosses, with a 2" square piece of sheet metal. This will serve to dissipate the extra heat generated at this point by reason of the doubled intensity. It will keep the heat from building up to the point where the electrical insulation might break down.

Where piping to be protected is regularly subjected to freezing temperatures, an automatic system is desirable. This consists of a thermostatic switch which supplies current to the lineal heater as required. The thermostat, in such case, is located at the coldest point, or at the point where the pipe is most likely to freeze first. The thermostat bulb may be taped to the pipe. In this case the surrounding air temperature and the temperature of the pipe, which is governed by the water flowing through it, actuates the switch. Or an open thermostat,

taking its temperature directly from the air, may be used. Most difficult to install, but yielding the highest efficiency of control, is where the thermostat bulb is installed directly in the pipe line. Control is taken from the temperature of the water which flows past it. In this case an oversized "tee" must be installed in the pipe line to allow for installation of the proper fittings.

One thermostat can control several lengths of cable. This may be accomplished by connecting the thermostat to one leg of the circuit supply wires feeding a multiple outlet box. Thus each cable, plugged into these outlets, will be controlled by the same thermostat. Wherever a thermostat is used, a pilot light should be installed to show when current is being consumed. This is extremely useful in checking the operation of the equipment or in the event that you have to adjust the temperature setting.

You will not find it necessary to protect your entire water system. Some isolated lines may be better protected by the use of frost-proof hydrants. The use of such equipment for an isolated, infrequently used spigot, will give you use of water at that point when you need it, but assure you of freeze-less operation without cost. These units, when shut off, drain the water from the riser to a point safely below the frost line.

Other uses for lineal heaters than the protection of pressure water systems are plentiful. These heating elements have been used extensively in eaves troughs and down-spouts to keep them ice-free. Permanent installations have been made along the lower edge of the roof of homes to prevent an ice ledge from forming. This application alone can mean much when alternate days and nights of thaw and freeze can build up an ice dam at the bottom of a roof to the point where the water backs up under the shingles and leaks down within the home. Installations in eaves troughs, down-spouts, and on the roof, need not be thermostatically controlled as automatic operation is not required. They are simply plugged in as needed.

Another use which has been made of lineal heaters, is in keeping cement steps ice-free. The heater, imbedded in the concrete, can eliminate the hazard encountered when going down the icy back stoop with a basket full of clothes. The same method of prevention has been provided on walks and driveways. These last two uses are very close to that for which lineal heaters were originally designed—soil heating. And the results are just as successful as electrically heated hotbeds have been.

In any installation, these heat-

ers should be used in accordance with the manufacturer's recommendations. They all supply printed instructions with their equipment giving complete installation details. You can also obtain help from the rural representative of your power supplier. But, if you have had trouble in past winters or anticipate any this coming year, now is the time to take care of it. Don't wait until the water is frozen. Fix up before freeze up.

U. S. Fact-Finders Abroad

Condensed from Foreign Agriculture

Quincy Ewing
Divison of Foreign Agricultural Information, OFAR

THE official eyes, and ears, and sometimes the voice, of United States agriculture abroad consist of 72 agricultural officers of the United States Foreign Service—attachés and others. Although their duties are many and broad, these officers are, in fact, agricultural reporters, sent out to gather information on the countries to which they are assigned. They report to the United States, either in person or in writing; and their information is useful not only to the Government but to all United States producers, marketers, and consumers of agricultural products.

Last winter the United States Congress called one of these reporters back to Washington to tell House and Senate committees exactly what were the effects of the 1950 drought in Yugoslavia. The Congress was considering an appeal from that country—the only Communist country that had broken with Moscow—for feed and food to relieve an emergency. That appeal, if justified, presented an opportunity to relieve human suffering and win friends.

The agricultural attaché at Belgrade, once a Montana agriculturist and an experiment station director, came home to tell the Congress the facts. He talked in simple earthy language about the ravages of the Yugoslavian drought, speaking from knowledge gained through personal observation of all parts of the country and from conversations with scores of farmers. He furnished the figures on production and supply that represented the back-

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Washington, D. C., October 1951

ground for the request for help. His testimony gave Congress a basis for action.

Later in the winter the House Foreign Affairs Committee also needed sound information on conditions in yet another country. A request had come in for 2 million tons of grain to relieve hunger in India, where crops were damaged in 1950 by floods, drought, and other calamities. First-hand facts were wanted. The agricultural counselor at the American Embassy at New Delhi was asked to come to Washington to supply them. He came, discussed India's situation fully before the Committee, and thus furnished the factual background for proper Congressional consideration of the Indian grain request.

The authoritative data furnished by the United States agricultural officers in connection with the Yugoslavian and Indian relief requests tended to focus greater attention upon the service given by these agricultural reporters. They are stationed at 53 diplomatic posts but have fact-finding responsibility for 62 countries. They are trained agricultural specialists with practical farm backgrounds. Every year they transmit to Washington a heavy volume of information about world agriculture. Their service provides a day-to-day knowledge of factors in the immediate and prospective supply of farm products and in the demand for them — especially products that the United States exports or imports.

This information is supplemented by reports from many diplomatic posts where agricultural officers are not stationed. All in all, about 50,000 reports and cables reach the State Department every year; and the State Department makes these available to other United States Government agencies, where the information they contain is evaluated and analyzed for use and for dissemination to the public.

Specific facts transmitted by United States agricultural officers include facts about planted acreages, weather conditions, crops and livestock, price trends, stocks, agricultural exports and imports, consumer purchasing power, and supplies of farm labor, seed, fertilizer, and farm equipment. This flow of information makes it possible to keep under constant study the effects of all developments in foreign agricultural policy as well as the influence of United States agricultural and trade policies on international farm trade.

United States reporting of world crop and livestock statistics is based on a schedule prepared annually in the United States Department of Agriculture. This is the timetable that the reporting officers abroad follow in transmitting their reports. Each report

is required by a certain date—a date that is synchronized with the needs of United States producers to aid them in their production and marketing decisions.

This agricultural reporting is not always a matter of obtaining official Government figures or other publicly available data in the countries where the officers are stationed although in many countries much information is obtained in just that way. Reporting conditions vary widely in different parts of the world. Some countries cooperate in making their data available; others do not. Many countries have no agricultural statistics at all. Over many expansive underdeveloped areas of the world geographical and educational problems and obstacles make it difficult for the United States agricultural officer to apply the normal techniques incident to accurate statistical reporting.

If the country to which an agricultural attaché is assigned has a well-developed agricultural statistical service, the reporting problem is simplified: the attaché establishes a reciprocal working relationship with local government officials and obtains from them the information he needs. In exchange he gives them data from the United States Department of Agriculture. In addition to making contacts with local Government officials, the attaché goes also to private trade sources such as warehousemen, processors, and exporters and trade officials. With them he exchanges official estimates of United States production for whatever information they may have to give. Assembling this solid core of agricultural facts is rarely a one-man job in any diplomatic post. Most reporting officers receive help from assistants.

Foreign agricultural reporting often calls for resourcefulness, initiative, and energy, particularly in countries where statistics are not available. Agricultural attachés frequently have to go into rugged, isolated country to make their own estimates, travelling by jeep, horse, and even by foot. They gather statistics by interviews with farmers, travelers, migrant traders, headmen in villages, and by other informal ways. In one country where local statistics were lacking, the attaché made annual train trips to check the variation in acreages of rice, wheat, cotton, tobacco, and other crops. He would count telegraph poles along the track opposite each kind of crop; and this count would furnish comparative estimates of the year-to-year acreage changes. Besides, when correlated with the attaché's knowledge of growing weather and his on-the-spot investigation of conditions, it would afford further indication of prospective production.

When the Government of Argentina blacked out, or refused to disclose, its agricultural statistics during the greater part of 1949–50, on the theory that its international marketing would thus be improved, it placed an added burden upon the agricultural staff of the American Embassy in Buenos Aires. This staff, which has a heavier reporting schedule than the agricultural staff of any other diplomatic post, had to and did get its data from whatever reliable nongovernment sources it could develop. As a result, statistics on Argentina's important production and stocks of such commodities as wool, wheat, corn, meat, and flaxseed continued to flow to the United States.

In one sugar-producing country the agricultural attaché arranged to obtain production data from each mill operator with the understanding that he would furnish the operator with whatever totals he was able to obtain. These totals, of course, would indicate the production of the entire country.

A United States agricultural attaché gives as well as gets. In a certain country an agricultural officer calling upon a potential local contact noticed that his host had in his office samples of local wheat.

"What varieties of wheat grow best in this country?" he asked.

"Oh, they all grow about the same," was the reply.

The attaché suggested selective planting to determine the best varieties. And the official, who acted upon the suggestion, was delighted with the results. Later the attaché arranged to obtain some new varieties from the United States, further establishing personal and international good will.

Agricultural attachés are often called upon by officials and citizens of the countries where they are assigned to give advice or assistance in initiating agricultural improvements. They also play a leading part in the negotiations and implementation of Point Four agreements for technical assistance.

Of what value to United States agriculture is the information furnished by these agricultural officers?

One use is as the statistical core of the world summaries of crop and livestock statistics published by the United States Department of Agriculture at scheduled intervals throughout the year.

In September 1950, for instance, a summary estimating the 1950–51 world cotton crop on the basis of information furnished by agricultural officers was published. It told American cotton producers, handlers, and marketers that the crop would probably amount to 27.4 million bales, or about 4 million bales less than the prospective world consumption. The fore-

cast brought into sharp focus the world need for cotton, showed why world cotton prices were soaring, and provided a basis for the United States Government program to increase greatly domestic cotton production. This and other information from United States agricultural officers helped form the basis also for the United States cotton export allocation program.

Subsequent reports from agricultural officers made possible the publication of a second scheduled summary on May 14, providing the United States cotton trade with more recent facts in the changing world cotton situation. This later summary showed that the gap between production and consumption for 1950–51 had widened to 5.5 million bales. It served, therefore, to intensify the United States domestic production effort.

Summaries of the world production of tobacco have helped the United States tobacco growers to adjust their acreage to probable demand, and also have helped the planning and administering of Government tobacco acreage allotment programs. United States Foreign Service reports of fluctuations in tobacco production, and of changes in the volume and character of consumer demand in various countries and regions, consistently help the domestic tobacco trade to find new foreign markets, or adjust its foreign marketing pattern to conform to conditions. After World War II the future of the world market for American-type tobacco was uncertain. Information from abroad, however, showed that consumer preference was changing and that foreign tobacco users were switching from foreign leaf to American tobacco and cigarettes because members of the United States armed forces had generously offered smokes to foreigners in different parts of the world and thus unconsciously acted as salesmen of American tobacco. Knowledge of that switch in foreign taste—which is continuing—gave tobacco producers an idea of what to expect. The foreign market has continued good and American producers have gaged their production accordingly.

In the fall of 1949 the world coffee market became erratic. Prices shot up as fear spread that stocks and production were falling too far behind. There was a run on the market, and too much buying for purely speculative reasons threatened the stability of the world coffee trade. Consumers, traders, a United States Senate subcommittee, and others wanted to know the statistical facts.

The United States Foreign Service reports supplied them. These reports from the coffee-

producing countries showed there was a sufficiently large present and potential supply of coffee to meet world needs, but that some increase in prices could be expected because of rising demand and smaller production. Publication of this data had an important role in removing fears of acute shortage. Responsible members of the coffee industry, greatly preferring gradual increase in coffee demand to speculative market fluctuations, appreciated the statistical clarification.

Thus, the agricultural reporting system operating through the United States Foreign Service functions to keep the United States in touch at all times with what is going on in today's one-world of agriculture.

Controlling Mice In Orchards

Condensed from American Agriculturist

W. Robert Eadie

At this time of year, fruit growers are thinking of ways and means of protecting their trees against over-winter damage from meadow mice.

There are a number of well-known ways to reduce the possibility of mouse damage. Some of these are: the use of hardware cloth tree guards, especially on young trees; frequent mowing to reduce mouse protective cover on the orchard floor; and the use of vegetation bare areas at tree bases. All of these practices have some value, but for real security an annual fall mouse-baiting program must be carried out.

A successful method of placing poisoned mouse bait by hand has long been in use. In this method, firm apples are cut into half-inch cubes and dusted lightly with a poison. The poison may be the U. S. Field Mouse rodenticide, usually obtained through county agricultural agents, or finely powdered arsenic (arsenic trioxide) may be used.

For either poison the bait is prepared in the same way. A 2-inch layer of apple cubes is placed in a large pan, and the poison is sifted over them while stirring, until a light, even coating is obtained. An ounce can of the U. S. Field Mouse rodenticide will prepare about 10 quarts of bait, while

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1 level teaspoonful will prepare 1 quart. One pound of the powdered arsenic will prepare 3 or 4 pecks of bait. One peck should treat 4 or 5 acres if the baits are carefully placed.

In hand-baiting the orchard, the poisoned baits are placed directly in active mouse runways or trails and in burrows. Three or four baits are placed around each tree and one or two between the rows. Each bait is covered with grass or mulch. A fork or ice pick may be used to handle the poisoned apple cubes. Never use bare hands with these highly toxic poisons. Good weather aids mouse control, since the mice are more active then and will find the baits more quickly.

While these hand-baiting methods are effective in mouse control, they are laborious and expensive in the large orchard, and are best adapted to small acreage orchards and some special situations. A new method has been developed by which mouse bait can be distributed rapidly with common mechanical seeders, resulting in good control under most conditions and permitting substantial savings in labor costs. Such savings may run as high as 75 per cent of the total costs of baiting the orchard.

Using one seeding device, the orchard can be baited at a rate of less than 15 minutes per acre. Last fall the method was used in over 10,000 acres of commercial orchards, with growers reporting generally good results.

Common hand-operated garden seeders may be used to distribute a special grain bait in lines across the orchard. The bait is dropped along the drip-line on both sides of each tree row in the heaviest grass cover. It is not necessary to criss-cross the orchard. In using garden-seeders the furrow openers are removed and the furrow closers either removed or raised as high as possible to avoid snagging in heavy vegetation. Seeders should be adjusted to deliver grain at a rate of 10–20 grains per foot of row. At this rate, 3 or 4 lbs. of bait per acre will be used.

Shut-off devices on seeders may be used to regulate the flow of grain, since the poison bait should not be dropped on open ground such as roadways or bare spots in the orchard. Bait in these places will not be found by mice and will be wasted. It may also introduce possible hazards to wildlife. Fence rows, borders, or uncultivated fields near orchards should be treated with a row of bait to reduce mouse concentrations.

Choosing good weather for the control operations is important since heavy rains may wash the poison from the bait. Light rains of short duration after placing the bait may not affect it seriously, but good weather during opera-

tions is an advantage. Bait should be placed before leaf-drop and before the grass mats down in late Fall. It is best if the grain can drop freely through the grass where the mice will find it more readily.

Growers with large orchards may adapt power-drawn seeders to speed up baiting operations. Corn planters have been adapted by using only one of the seeding units with the smallest possible seed plate. Other growers have attached garden seeder units to light tractors in various ways. One effective method is to attach a seeder unit to the bolts that normally hold a cutter bar on a light tractor with side-mounted mower. This can be easily raised or lowered to control the flow of bait.

One or two commercial firms have been selling prepared bait of the type used in this method of orchard-mouse control. The special bait may be prepared by the grower himself according to the following formula:

100 lbs. cracked corn
(coarsely cracked)
2 lbs. zinc phosphide
1 quart vegetable oil
½ ounce methyl green dye

Wear gloves and mix the zinc phosphide and the methyl green dye with the oil to form a thin paste. Avoid breathing the dust, and work outdoors or in an open well-ventilated place. Pour the paste over the grain in a large metal tub and use a hoe to mix the mass very completely so that the grain is evenly coated. Avoid breathing the gas given off while mixing. Any drum-type mixer may be used to prepare the bait, but it should be scrubbed out thoroughly with soapy water before it is used for any other purpose.

The prepared grain may be sacked immediately. Since zinc phosphide is poisonous to humans and to all animals, the material should be stored carefully. Do not store the prepared bait in tightly closed buildings where people or animals are present. It will keep several months in a dry place without serious loss of strength, but it should not be stored from one season to the next. Label all containers "Poison" and use them only for this purpose.

Good Cattle From Good Land

Condensed from Shorthorn World

Dr. A. D. Weber

On an individual farm, all production factors tend to stabilize at about the same level. Mediocrity in one important factor appears to exert a sort of magnetic force, pulling everything and everybody down to its own plane of activity. Likewise, where a high degree of excellence is strong enough to persist in one factor, be it human, soil, crops, livestock, then all the other factors associated with it tend to rise to a similar level of performance. This mediocrity and superiority seldom, if ever, are teammates for long on the same farm.

Wide awake, progressive farmers are continually seeking ways and means of improving the land in order to have higher-yielding crops of better quality and more nutritious pastures with greater carrying capacity. As they put more into the land they get more from it, and as a consequence they must, of necessity, also be concerned with the profitable utilization of grass, roughage and feed grains.

The better the land and the greater the fixed charges against it, the more important it becomes to produce cattle of good quality instead of the plain, nondescript kind. The improvement of land and the improvement of cattle go hand in hand. And improvements in land and cattle bring better living conditions and enriched experiences for those responsible for these advances.

At this point, it is perhaps apropos to inquire into what the improvement of land entails. Since it is assumed that the improvement of land and the improvement of cattle go hand in hand, does it necessarily follow that cattle can be bred to their highest degree of excellence on only the most fertile land located where the climate is the most favorable for maximum yields of the very highest quality grass, roughage, and feed grain? When, if ever, can low productivity, insofar as land is concerned, contribute significantly to efficiency in beef cattle production?

There are good reasons for believing that maximum returns are realized from plain, so-called unimproved types of cattle where

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land is both poor and cheap, and overhead costs and carrying charges are of little consequence; provided, of course, that the cattle themselves, despite their lack of quality, have the constitutional vigor and stamina to thrive and multiply when subjected to rigorous environmental conditions. Yet, are we justified in assuming that because plain, nondescript cattle give the best account of themselves under this sort of a regimen that nothing is to be gained by attempting to improve the cattle in regions where soil is poor, vegetation sparse, and rainfall scanty? Can land such as this be used for the production of good beef cattle? If so, is it necessary to improve it in order to improve the cattle which are produced there? And what about the best quality of cattle to produce on poor, badly eroded land in regions of relatively high rainfall?

These questions are not easy to answer. Perhaps there is no answer that is wholly satisfactory. Yet it is important to recognize that the way in which these questions are answered by cattlemen will be of great significance to the agricultural economy of the United States in the next ten or twenty years.

To challenge your thinking, I should like to ask, "What is good land anyway?" Let's not worry because some of us must be content to produce cattle on land that is not as fertile or is not located as advantageously as that owned by someone else.

After all the most important consideration is not how fertile the land is nor how much rain falls on it, but rather whether it is being used in the best possible manner. It is particularly important that a system of beef cattle production be used which is in accord with the productive capacities and conservation needs of the individual farm or ranch. Manifestly, these capacities and needs reflect variations in soils, rainfall, adapted crops, size of farms, markets and even abilities of the operators. That is why there is such a wide range in types of farming. Stability and prosperity for American agriculture will result from wide-spread use of systems of livestock production which fit particular types of farming and have been adjusted to meet conditions peculiar to individual farms and ranches.

Viewed in this light, all land is good if it has been used properly or can be improved if it has deteriorated from its virgin condition because of mismanagement. Just because one acre in a particular section of the country will furnish grazing for one cow for six months whereas in another region fifteen acres are required does not mean that the one acre is good and the fifteen acres are bad. Both are good if wisely used for the

purpose and in the manner for which they are best adapted.

It is in the public interest to use all land wisely. I mentioned earlier that plain, nondescript cattle will yield the greatest return on low-grade land where overhead charges can be held to a minimum. Now I wish to venture the opinion, which I believe is amply substantiated by the experiences of countless ranchers in the range and semi-range areas, that good cattle properly managed utilize so-called low-grade land in practically every section of the country to better advantage than do common, unimproved or mixed cattle. It is important to remember always that land can be rated exceedingly poor from the standpoint of crop production and still deserve to be rated good for grazing purposes.

Grass is the most important crop in the United States. Not only is it grown on more acres than any other crop, but there is greater need for increasing grass acreage than there is for expanding the acreage of any other crop. This need arises from the fact that good grass is the key to sound land use. On many farms effective soil conservation can be achieved only when grass is recognized as the most important crop on the farm. Likewise, balanced farming objectives usually can be attained most effectively when grass has its proper place in farm operations.

Profitable livestock enterprises are the key to a sound grass program. Systems of livestock production must be used which are adapted to local grassland conditions and to the specific needs of the individual farm. In other words, profits are not assured merely because livestock eat off grass without harming the pasture.

Thus, emphasis should be on the role of grass in a balanced farm program with livestock sales providing the major source of farm income. It is manifestly impossible to attain this objective unless major stress is placed on the production of good cattle. It is true, of course, that a few farmers will continue to find it profitable to feed plain cattle. But the profits these feeders make will be at the expense of those who produced the plain cattle. Stated differently, it may pay to buy and feed common cattle, but maximum returns are never received from raising that kind. And usually where the quality of a cow herd is declining, the productivity of the land is not being maintained.

By and large, therefore, the success or failure of a grassland program will be determined by the extent to which farmers market grass profitably through good cat-

tle. Every acre seeded to grass should give immediate promise of yielding a greater profit than the same acre in a cash crop, assuming that due allowance has been made for its long-time conservation values in a coordinated crop and livestock program.

There is a real need for more and better pastures and more and better cattle to graze them. The use of approved management procedures will improve many old, permanent pastures. And new pastures usually can be established on almost any farm if adapted seed is used and good cultural practices are followed.

Yet a word of caution to those who are convinced that they should embark on a program of grassland farming is perhaps in order. Owing to weather vagaries in some parts of the country, it is not always an easy matter to establish a stand of grass. Cash returns are not forthcoming immediately, especially where a breeding herd is depended upon to furnish a market for grass. Then, too, it is rather costly in these times to convert a grain farm into a beef cattle farm. Fences must be built and water facilities provided. Shelters need not be elaborate, but when needed they represent an important item of expense. And a very considerable cash outlay is required to finance beef cattle operations nowadays.

While these barriers appear rather formidable, they need not deter a livestock-minded farmer from increasing his grass acreage and getting started on a sound Shorthorn breeding program. It is better to grow into the business than to expand too rapidly and thereby take unwarranted financial risks, but with careful planning an expanded grass acreage will give profitable stability to farm operations.

Hence, it seems to me that special emphasis should be given to grass in a discussion of the improvement of land. Yet there is no gainsaying that without good cattle to use the grass, the problem isn't solved and we're right back where we started. We need to realize that the improvement of land and the improvement of cattle go hand in hand because of their dependence upon good grass and its efficient utilization.

How To Dry Off Cows

Condensed from Pennsylvania Farmer

C. B. Knodt
Pennsylvania State College

MANY questions exist in the minds of most dairymen as to how to dry off their cows. The poorer cows in a herd are usually not much of a problem, but the better cows may give trouble.

We must not forget the importance of an adequate dry period. Very little research has been done on the most desirable length of dry period. We at the Pennsylvania Agricultural Experiment Station have started recently a long time project on this very problem, but it will be many years before we can collect the data from this study and report the results.

The studies that have been conducted indicate that a dry period of 55 to 60 days is most desirable. There can be no question but what a dry period of this length, or longer, is essential if cows are going to produce well year after year. All cows lose weight during their lactation. There is also a loss in reserves of minerals such as calcium and phosphorous. An adequate dry period is essential to replenish these reserves for the next lactation. Some herdsmen are now giving their cows dry periods of 90 days. They believe that they gain in production in the next lactation and that the cows last longer in their herds.

Don't starve cows dry. This may result in serious injury to them. If you stop feeding and watering cows they will, of course, dry off but with serious harm. This will put them in poor condition for the next lactation and may be one of the important causes of ketosis, which is becoming a serious problem. If cows are starved, they will draw upon their body reserves in order to make milk. Other methods have been tried and proved which are much more acceptable.

In feeding the dry cow, always remember that you are preparing her for her next lactation. Cows in good condition at calving will produce more milk of a higher fat content during the next lactation than cows in poor condition. Dry cows should receive all of the

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good quality roughage in the form of hay and silage that they will eat. Cows that are in good condition, may not require grain in addition, but cows in poor condition should be fed four to six pounds per day of a good 14 or 16 per cent protein grain ration. Cutting feed for a few days results in very little decrease in milk production at the time of drying off since the cow will simply draw on her reserves to make milk.

In understanding how to dry off cows we should have some idea as to how milk is made in the udder of a cow. There are within the udder millions of small cells which remove materials such as sugar, protein, fat, minerals, etc., from the blood and make milk from them. The number of these cells corresponds closely to the size of the udder in most cases, and so we want a large udder if we are going to have high production. When milk accumulates within the udder, it produces pressure much like air in a balloon. The pressure reaches a level at about eight to ten hours after milking when milk production practically stops. Only very small amounts will be made after that time. If we do not remove this milk after 48 hours, it is gradually reabsorbed into the blood stream. The only way to really stop milk production is by leaving the milk in the udder so that the pressure in the udder is high enough to prevent further production. In three to four days resorption occurs and the udder soon stops producing milk. It becomes dry in about ten days.

Every cow is an individual. The same method of drying off cannot be used with all cows. Many dairymen use a method of irregular or intermittent milking. In using this method cows are milked once per day for several days, then every other day, and an increased number of milkings are skipped until the cows are dry. For most cows this method requires too much labor and greatly prolongs the drying off period. This method should be followed with cows giving large amounts of milk or with those that have had serious cases of mastitis. Holsteins giving in excess of 25 pounds per day, as well as Jerseys and other breeds in excess of 20 pounds per day should be milked once per day for several days and then milking stopped completely. Also cows with very pendulous udders should be dried off according to this procedure.

A method which is seldom used and for which there is very little justification is that of incomplete milking. It must be remembered that we wish to build up pressure in the udder and in this way stop milk production and finally get the udder to return to a dry con-

dition. Incomplete milking stimulates the udder into further production by decreasing pressure and also as a result of the manipulation of the udder itself.

With the majority of cows it is best simply to stop milking them. In this way pressure builds up inside the udder and milk production stops in two days or less. It saves in labor and speeds up the drying off process. Cows are then able to go ahead and build up body reserves rapidly. Cutting feed will do more injury to the cow in that body energy reserves will be rapidly depleted. Not only are there the demands of the cow, but one should not forget the demands of the calf. Adequate feeding and care during the dry period are essential. A dry period of 55 to 60 days minimum should be allowed.

Goose Raising Goes Modern

Condensed from Poultry Tribune

G. T. Klein
University of Massachusetts

NEW THINGS are happening in the goose raising business. Many goose raisers are finding that they can step up their production profitably. There's a good market for the meat; feathers are in demand; and the skin and down have special uses.

Geese are used in some instances for weeding crops. Knowledge of hatching goose eggs, once a limited factor, has been greatly broadened and satisfactory hatches can be made now by artificial methods.

Last season, the Massachusets market for New-York-style dressed weight was about 65 cents a pound. Growers sold their geese for about 40 cents a pound alive. The heaviest buyers are of Jewish, Polish, Lithuanian, and other European nationalities. But the market is not limited to these people.

In New Jersey, there is a company specializing in the processing of geese. The large feathers are removed and sold, leaving the down on the skin. The skin is tanned, dyed pastel colors, and made into powder puffs called

Reprinted by permission from Poultry Tribune,
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swandown or goosedown puffs. It is used also for trimmings for bedroom slippers and ladies wearing apparel. This company cans the grease and meat, both of which bring good prices.

Prof. E. L. Dakan and co-workers of Ohio State University have done some of the most recent research work on geese. This work has been so convincing that goose raising in Ohio has been expanded considerably, and an Ohio incubator company has designed a machine especially for hatching goose eggs.

In Massachusetts, we consider Ralph McIlvana to be one of our most successful and best informed goose growers and gosling producers. A flock of 235 Toulouse breeders are laying an average of 44 eggs a season from which 54 to 58 per cent hatchability is expected. The goslings find a ready sale at $1.50 each.

McIlvana has been pen breeding geese for 15 years or more. Through careful selection of families, hatchability has increased from 30 to 55 or 60 per cent. Egg production has been increased from 20 to 44 eggs to the breeder.

McIlvana likes a 14-pound female at maturity, which is about eight months. He picks the breeders before market birds are sold.

While the year-old geese will lay eggs, they are small and goslings are small and uneven. Breeders reach their peak at about the eighth year, he thinks, and are seldom held beyond the eleventh or twelfth year. Average egg size is six to eight ounces each.

The McIlvana breeders are mated three geese and a gander. He uses both flock and pen matings. It's a problem to distinguish the sexes, but conformation and voice offer differences. Ganders make little noise when handled and are coarser in the head and neck. The goose has a coarser voice and makes more noise when handled.

Nests are $18 \times 24 \times 18$ inches, but don't expect geese to lay more than half of the eggs in them. Wing banding of the goslings to identify families is a bit of a problem because of the initial small size of the wing web and the rapid growth later. Special bands are needed. New blood has not been introduced into this flock in a dozen years.

Close inbreeding has been avoided by use of the pen system. There has been considerable improvement all along the line.

McIlvana incubates the eggs to the twenty-eighth day in the special incubator designed for goose hatching, carrying the temperature at 100 degrees F. and the humidity at 84 to 86 per cent. The hatching is done in old-style still air machines carried at 102 to 103 degrees F. In both the special

goose incubator and the hatching machine, the eggs are sprinkled with water a little warmer than the eggs. Wet towels also are used occasionally during the hatch, and the cellar floor is kept wet to add room humidity. Most observers agree that 180 degrees turning in the incubators is quite important.

The goslings are started in brooder houses under gas or oil brooders. A house handles 100 goslings to range age at five or six weeks. They are started and fed on a complete growing feed supplemented with chopped green feeds.

The growing geese have little grain, but they get whole corn three or four weeks before being marketed. McIlvana feeds grain during the growing period if pasture gets short.

Carl Randles, working at Ohio State University, found that breeders will eat about 100 pounds of feed between January 1 and June 30. This can be either pelleted all-mash breeder ration carrying about 18 per cent protein or a 24 per cent pelleted mash fed with limited grain. The breeders can be ranged where grass can be had in winter and early spring. He found 50-gallon automatic fountains very successful.

Randles found that goslings can be brooded in numbers up to 100 to a house and stove. They can be fed on pellets and grass. When reared in large numbers, food from the range alone did not produce satisfactory growth. Range supplemented with grain and pelleted mash gave an efficiency of 2.95 pounds of feed for a pound of gain. At 15 weeks of age, White Emdens averaged 11.4 pounds.

Wayne Alleshouse, in northeastern Ohio, sells hundreds of goslings a year and makes these recommendations on brooding. For brooding to 8 weeks, a 14 × 16 ft. floor space is needed for 100 goslings and a coal, gas, oil, or wood brooder that heats the entire room to keep the litter drier.

Any cheap litter, such as corn cobs, straw, sawdust, or shavings, is satisfactory. Geese require large amounts of litter, and Alleshouse recommends adding some new sawdust or shavings every day or two. An 18-inch partition between pens is sufficient to confine goslings since they cannot fly or jump.

The Ohio hatcheryman finds that the brooding period is over at eight weeks. They are then well feathered and weigh 8 to 12 pounds. They can be turned out on range without need of shelter of any kind. They need plenty of drinking water, but they do not need water for swimming. Goslings grow at the rate of a pound a week to 10 or 11 weeks of age.

Alleshouse, like McIlvano, observes that green feeds can be fed in large amounts in the brooder house and birds will live almost exclusively on grass. Alleshouse likes to use small pellets for starting and he thinks the supplemental range feed can be entirely grain. For fattening, he likes to confine his geese to a pen three or four weeks before marketing. Whole corn gives a good finish.

Dressing is practically the same as for ducks. Feathers can be plucked either wet or dry, and the carcass can be cleaned by shaving or by waxing. In fact, many Massachusetts growers have their geese custom dressed for 25 cents each by duck growers who have modern mechanical equipment.

Having been reared near a cotton growing area of Missouri, I am familiar with the talk of the great grazing habits and weeding ability of geese. It is said that a goose can weed an acre of cotton, and you can tell the number of acres a man has by the number of geese around his place. Start a goose walking between rows of cotton, and he will go to the opposite end eating grass every step.

Recently there has been considerable written about their ability to weed potato and strawberry fields. In commenting on this, one experienced grower said that geese weed fields better if they are thirsty when turned out of the pens, and if their water is at the far end of the field. This grower also observes that certain types of grasses and weeds are not eaten if the geese can get enough of the grasses they like.

The meaning of life, its purpose and all its joys, comes out of being ready to help others.

—Sir Wilfred Grenfell

More Pigs Per Sow

Condensed from Successful Farming

E. L. Quaife
Iowa State College

THE test of a brood sow is her ability to farrow a good litter of pigs and then take care of them. Many sows farrow plenty of pigs, but don't have the mothering and milking ability to take care of them after they are born. Others just don't farrow enough pigs in the first place. It's the number of pigs left at weaning time that counts. Picking the right kind of gilt can go a long way in assuring you of a good-sized litter at weaning time.

Last spring, according to official records, farmers weaned an average of 6.59 pigs per litter. This is a 30-percent increase since 1924, when the average was only 5.12 pigs per litter. How much better can we do? Let's set our goal at 7 pigs weaned per litter.

To reach this goal, we need at least one more pig farrowed per litter. Today, we are losing around 25 percent of all live pigs farrowed, and it's very doubtful if this loss can be reduced much below 20 percent. So, to get one more pig per litter, we need to consider some of the factors responsible for litter size.

No one factor can be singled out as the most important, but here are five you might consider in increasing the number of pigs weaned per litter:

1. Breed gilts from 8 to 9 months of age.
2. Have gilts in good health at breeding time.
3. Save gilts with good type and appearance.
4. Select gilts from large litters —good milking dams.
5. Use a fertile boar and breed gilts at the most favorable time of the heat period if pen breeding is used.

The age of the gilt at breeding time cannot be overlooked. Gilts are often bred too young. They should be well grown and bred to farrow at 11 to 12 months of age. Some experimental work at the Missouri Experiment Station compared gilts bred at 5½ months of age with others bred at 9 months. Gilts at 5½ months proved sexually mature but not reproductively mature.

The experiment also showed

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Des Moines, Iowa, October 1951

that for each additional 10 days of age, gilts ovulate .2 of an egg more. Therefore, the 9-months-old gilts were ovulating approximately 2 eggs more when they came in heat than the 5½-months-old gilts. This alone allowed a possibility of two more pigs per gilt at farrowing time.

They also found that there is a greater death loss of the fertilized eggs in young, immature gilts during first month of pregnancy than in older gilts. Faulty nutrition is very likely the cause. A young, growing gilt just doesn't have the capacity to eat enough feed to care for her growth, and, at the same time, produce a large litter of good-sized pigs. The average sow reaches her greatest productive ability about her third farrowing. However, sows have been known to remain productive for 22 or more farrowings.

The condition and health of the gilt at breeding time is another important point. She should be in a good gaining condition, but not laden with fat. Some producers, sort out their gilts at weaning time and put them in a pasture by themselves and feed a ration which encourages growth rather than fat.

Gilts, kept away from the fattening hogs during the fall, often escape the flu even if it hits the fattening hogs. Gilts affected with flu anywhere near the time of breeding usually have small, weak, and uneven litters. When gilts have the flu, they should be restored to health before breeding. The same applies to the boar.

As 75 percent of the sows which farrow in the spring are bred as gilts in the fall, it is easy to see how the pig crop might be affected.

Type and appearance are the most commonly used guides in selecting breeding gilts. William Marsaw, a master swine producer from Black Hawk County, Iowa, says: "My son and I spend several hours picking out our gilts. We mark the gilts from good litters, and we put them on the feeding floor and look them over carefully as to their type and mammary development. Later we go over them a second time and cull still further.

The head and underline are two fairly good guides in selecting gilts. More stress should be put upon femininity about the face and head. A gilt thick between the eyes, heavy in the jowl, and lardy about the face seldom proves to be a good mother. Such animals often have difficulty in seeing, especially if they have a heavy, drooping ear. Also, pick out gilts with a large, bright eye.

A long underline is assured by good length of body. Good depth must also be considered. The underlines should carry at least 6 clean-cut teats on each side, and be free from hair. As a rule, the

straight-gun, barreled-belly gilt has fewer teats and is often coarse in nature. A hairy belly with blisterlike teats usually indicates a poor-milking sow. Gilts with inverted nipples are guite common and should be culled out. The number of teats has very little to do with the number of pigs a sow farrows, but has a big influence on the number of pigs she can wean.

Inheritance is another factor which certainly helps determine the size of the litter. However, due to the short time breeding animals remain on the farm, the value attached to inheritance has not been as great as in longer-lived animals such as the dairy cow. Authorities at Iowa State College believe that it would take 10 years through a program of selection to increase the litter size by one pig.

Even so, it's a good practice to select gilts from good-sized litters which have made good growth during the suckling period. This means the gilt had a good mother, and should inherit these qualities.

The producer can go one step further in selection. By selecting gilts from a sow which has raised two good litters, the owner can be even more certain that the gilt will repeat her dam's performance.

A prominent Indiana farmer, who handles several breeds of boars, suggests a program of production which has merit if the sows are kept for more than one farrowing. When a producer buys Boar Number 1, he is expected to use this boar on the same sows for three successive farrowings. All pigs from the first and third farrowings are sold, and gilts for breeding are saved from the second farrowing. This lets the producer select gilts from sows which have done well twice. These gilts are then bred to Boar Number 2. The same procedure is followed involving Boar Number 3. Such a program affords an opportunity of cashing in on inheritance values.

The boar's influence on litter size is a much-debated subject. At the Missouri Experiment Station, investigators found that the boar's influence shows up in the gilts he sires, and not so much in the size of the immediate litters.

However, there is a probability that a boar, because of his condition or use, might not fertilize all the ova produced and a small litter will result. It is good management not to overuse or abuse the boar. He should be obtained a month or so before using and accustomed to his surroundings and management. It's a good idea to try him out on some market gilts, to see if he will work.

Tried boars on gilts, and young or tried boars on old sows, reduce the gamble in breeding. The boar can run with small herds of 10 or 12 sows. In herds of 30 or more sows where several boars are used,

the boars should be alternated.

Pen breeding is advisable if a large number of sows are bred to one boar. When pen breeding is practiced, breed the sows during the latter part of the heat period. At that time, ova are farther down the Fallopian tube and are reached more readily by the sperm cells of the male. If the sow is bred early in her heat period, she should be mated a second time. Test the boar for brucellosis before bringing him onto the farm.

Any one of these factors or a combination of several might cause small litters. Probably the one violated most is breeding young and immature gilts. Needless to add, good nutrition, both before and after gestation, must accompany the observation of the five factors mentioned. However, the top-notch hograiser will be on the lookout for them all, and get a higher pig average per litter.

Profit In Ponies

Condensed from New England Homestead

Esther T. Latting

THERE is a growing demand for ponies in this country and more and more people are finding it a paying hobby or a good part-time business. The work of caring for a few ponies is light, they are not expensive to keep, and there is a ready sale for colts.

In the middle west, ponies have been big business for a number of years. Several auction sales are annual affairs with four and five hundred ponies being sold in two or three days. Top prices run to over $4,000. Fairs and horse shows are adding more classes for the ponies not only for children but for adult drivers, in hand and breeding classes. There are even a few all pony shows.

In New England interest has been slower in growing but now seems to be decidedly on the increase. Through the efforts of the Northeast Pony Owners and Breeders Association which was organized last November, a number of shows have added classes for Shetland and Harness Show ponies this season. They have proven extremely popular with the audience although the number of exhibitors is still quite limited. There is something fascinating about these beautiful

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miniature animals who have the fire and heart of a much larger horse.

The three commonly recognized breeds of small ponies, are Shetland, Harness Show Pony, and Welsh. A few Hackneys are small enough to get in the 48 inch and under classes, too. In New England there are only about a dozen breeders of registered ponies and a slightly larger number of breeders of grades. Many ponies are still being brought in from the middle west.

Tourists passing our farm who see the ponies and stop, often ask what people buy them for. Of course the first use one thinks of for a pony is as a pet for children. They are ideal for this provided the child is given enough supervision to prevent him—or her—teasing and spoiling the pony. The reputation for meanness which is wrongly attached to ponies, is due to poor handling. We have had over 300 ponies and have never had one mean one on the place. We have never seen a mean colt. They are often timid and sometimes high strung and nervous but never naturally mean.

Show prospects, breeding, and pony rings are other uses for ponies.

When we had grade ponies, we sold the majority of them for children's pets. Our present registered Shetlands go largely to breeders although many of the stud colts are still sold as pets.

We find it averages about $50 per year to keep a pony. This includes advertising, feed, upkeep on fencing and buildings, veterinary, trucking, showing, and other miscellaneous expenses. A mare should produce a colt a year. Grade colts sell at the age of five months from $100 to $150 and registered ones from $150 to $300. Some of them, if they are particularly promising individuals, will go even higher.

With registered brood mares and stallions, the price depends on the blood lines, conformation, show winnings, and the animal's proven ability to transmit its good characteristics to its offspring. Prices range from $400 up. For a really good proven brood mare—if you can find one—you should expect to pay $550 to $600. Many will run higher. They can often be bought in the middle west for $50 to $100 less but the transportation will more than make up the difference. A proven stallion will cost $500 to $1,000. The best are not for sale. When a breeder finds a stallion prepotent for good conformation and disposition, he has something on which it is difficult to put a price. The value of the stallion is equal to the combined value of all the mares he is bred to.

The most famous stallion this country has ever produced was probably King Larigo. My guess

is that nearly 50% of the ponies in the United States to-day carry some of his blood. Many breeding programs have been based entirely on Larigo blood. A few of his sons are still living. Two of his sons whose influence on the present day Shetland is very marked, died last year—King's Dappled Supreme and Larigo's Nite Life.

Shetlands come in almost every color to be found in horses. Some are more popular than others and for this reason bring higher prices. The silver dapples and sorrels with white manes and tails are probably the most sought after. Recently two or three spotted ponies have been doing a lot of show winning and this has brought the spot back into the lime light. Since ponies have seldom been bred for any specific color, you may expect almost any color in your colts. This year we had black colts from a sorrel and white, a solid sorrel, and silver dapple mares. They were all sired by a liver chestnut stallion. Next year from the same cross, we may get entirely different color. We run a herd of mixed colors in an effort to have ponies to please any purchaser. Many breeders specialize and have a herd of only one color selling all off-color colts.

The study of ponies is fascinating, caring for them and training them is fun, and they have proven a profitable venture for us.

Hurry-up Seed Plan

Condensed from Kansas Farmer

RAPID increase of new grass and legume seed supplies is the goal of the National Seed Foundation. This project was organized 2 years ago. It is a vehicle for co-ordinating seed facilities of the various states to develop new varieties more rapidly and make them available to farmers sooner.

Co-operating in the project are state experiment stations, several USDA agencies, the International Crop Improvement Association and the American Seed Trade Association.

There is a 16-man planning committee which is comparable to the board of directors of an organization. It consists of 2 representatives from each of the 4 regional experiment station groups, from the International Crop Improvement Association,

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Topeka, Kansas, September 15, 1951

the PMA and the Bureau of Plant Industry, Soils and Agricultural Engineering.

Then in co-operating states the experiment station director names a state foundation seed representative who handles the operational phases of the program in the state co-operation with Foundation Seed Project personnel.

Here is the way the project works: A new grass or legume variety is developed by plant breeders. If it shows promise of wide use, the foundation buys the seed supplies thru the CCC. This seed then is allotted to states whose producers make a specialty of producing seed; usually where the soil and climatic conditions are conducive to high seed yields. Thru co-ordinated effort the process of increasing scarce seed supplies is cut to a minimum of time.

C. S. Garrison, executive secretary of the foundation project, with headquarters at Beltsville, Md., points out that it normally takes about 20 years to go from nothing to an adequate supply of a new alfalfa variety. Thru the foundation they hope to achieve adequate seed supplies in 6 years.

First varieties selected by the foundation for increase were Tift Sudan grass, Kenland red clover and Atlantic alfalfa.

Red clover generally is considered as a biennial legume. Actually it is a perennial like alfalfa, but the attacks of diseases and insects have reduced it to the 2-year level. Important among those diseases and insects are southern anthracnose, clover mildew, root borer and clover weevil.

Kenland is resistant to southern anthracnose and clover mildew. For that reason it produces more luxuriant forage crops, altho it seldom lives for more than 2 years.

More recently other varieties have been added to the list. They include Buffalo and Ranger alfalfa, Dixie crimson clover and Climax lespedeza.

The foundation anticipates that the annual requirement of Buffalo foundation seed is between 15,000 and 20,000 pounds. They figure that much is needed to provide adequate supplies of certified seed for production of alfalfa for forage thru the central alfalfa belt where Buffalo is adapted.

For rapid increase the National Foundation looks favorably on the dry areas along the Pacific coast and in the Southwest where they talk in terms of 1,000 pounds of seed an acre instead of 2 or 3 bushels an acre. They look to those areas for rapid increase of seed supplies. And one generation in that climate will not change quality or characteristics of seed.

There have been unhappy seed situations in the past which the Foundation might have been able to prevent had it existed. In case of Tift Sudan grass, important in

Southeastern states, there was hardly any pure seed available 4 years after it was released to farmers. Pure seed strains were neglected and a big job of selecting had to be done over again.

Ranger alfalfa provides another example. Seed supply got ahead of demand soon after the variety was released. Seed growers were afraid to hold to their seed and keep their money tied up. It was released into trade channels. Soon demand for Ranger was up again and pure seed supplies were gone.

The National Foundation hopes to prevent those situations in the future by being able to assure seed producers of a market for some new variety, taking it off their hands thru the CCC.

Feeding Can Cause Wet Litter

Condensed from Everybodys Poultry Magazine

E. P. Singsen

DURING the winter, we hear numerous complaints about wet litter in poultry houses. These complaints come from both broiler growers and market egg producers. Some of the trouble occurs in relatively cheap poultry houses and some of it in the best poultry houses.

The principal function of litter in the poultry house is to act as bedding to absorb moisture from the droppings and to give that moisture off to the air again. Occasionally the amount of water going into the litter exceeds the ability of the litter to give the water off again and a disagreeable wet litter condition soon develops.

Several years ago, Professor T. B. Charles and his associates at the University of New Hampshire listed the following as the most important factors influencing moisture in poultry house litter:

(1) poultry droppings; (2) respiration; (3) water spillage by birds and attendants; (4) atmospheric moisture; (5) rain and snow beating into the pen. Under these conditions, the principal source of moisture is the poultry droppings themselves. As a general rule, a good ventilation system will get rid of the water passed in the droppings, but occasionally the amount of water passed in the droppings is so increased that it is impossible for the ventilation system to keep up with it and wet litter develops. At least three types of nutritional

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effects are seen in the field that may influence this moisture problem. They are: (1) laxative materials, (2) the protein level and source and (3) the salt content of the ration.

Some of the more common laxative materials are epsom salts, molasses and molasses by-products, and milk products. Most poultrymen know what these materials are and understand how they act and expect to have wet loose droppings if they feed appreciable amounts of them. If a serious wet litter problem is encountered where these materials are being used, they should be reduced in amount or eliminated from the diet entirely.

The effect of protein level and source on water intake and excretion is not nearly as well understood as the effect of laxative materials. It is a well known fact, however, that water is needed for the metabolism of protein in the chicken's body and the excretion of its end product uric acid. As the protein intake goes up, more water is necessary to metabolize it in the body and more water is necessary to excrete the end product. This effect was shown very clearly in a recent publication by James and Wheeler from the University of Georgia. They showed that broilers receiving a 20 per cent protein ration consumed 15 per cent more water than birds receiving 15 per cent protein. Birds fed 25 per cent protein consumed nearly 25 per cent more water than the birds on the 15 per cent ration. All of the birds consumed about the same total amount of feed. These authors calculated that one thousand 12-week old birds would void five gallons more water per day on a 20 per cent protein ration than they would on a 15 per cent protein ration. Under practical conditions, this simply means that protein levels should stay at or below 20 per cent as broilers approach market weight. Higher levels of protein may invite wet litter problems.

The same situation holds true for laying hens except that the desired protein intake is around 15 per cent for layers instead of 20 per cent as is the case with broilers. For many commercial laying flocks the poultryman buys a laying mash which contains 20 to 22 per cent protein. This mash is designed to be fed half and half with a scratch feed which contains approximately 10 per cent of protein. If the half-and-half feeding schedule is followed, everything is usually satisfactory, but occasionally the poultryman feeds 75 per cent or 80 per cent mash and 20 to 25 per cent of the scratch grain, giving a total intake of 17.5 to 18 per cent protein. As a general rule, laying birds receiving less than 15 per cent protein will have very dry droppings.

Above 15 per cent protein, droppings become progressively wetter as the protein level goes up. The point at which wet litter actually begins to show up will be determined by the number of birds in the pen, the adequacy of the ventilation, and the season of the year. Actually 15 per cent of protein will support good egg production in most laying flocks and higher levels mean that you are probably wasting protein as well as causing wet litter troubles.

Glista and Scott of the University of Illinois have shown that soybean oil meal can increase the water consumption of growing chicks. This is unfortunate since soybean oil meal is a high quality and economical protein supplement in poultry feeds. Large amounts of soybean oil meal will continue to be used in poultry feeds and this simply means that care must be taken not to increase water consumption by several different factors simultaneously. With normal protein levels, where we have no laxative materials and minimum levels of salt, soybean oil meal should give us no serious trouble.

Work published by Barlow, Slinger and Zimmer of the Ontario Agricultural College at Guelph, Ontario, show that as the salt intake of chicks goes up, water consumption goes up. Under most conditions, one-half per cent of added salt is sufficient in any poultry ration. If high salt ingredients are present in the feed this should be reduced to 25 per cent or eliminated entirely. This point was emphasized again by Dr. T. F. Heuser of Cornell University at the 1950 Cornell Nutrition School, when he gave some data on the effect of salt on the percentage water in the droppings of birds. His facts are summarized in the following table:

Percent Added Salt in Ration	Percent Moisture in Droppings	Appearance of Droppings
None	63.5	Dry
0.25	70.0	Dry
0.50	75.0	Moist
1.0	79.0	Wet
2.0	80.5	Liquid
4.0	83.0	Very Liquid

The poultryman who is feeding laying hens 75 per cent of mash and 25 per cent scratch feed may also be over-feeding on salt as well as protein and so is aggravating an already bad situation. This condition can be further aggravated by feeding a supplement which contains high levels of salt. Many of our wet litter problems can be controlled or appreciably reduced at least by getting the protein intake down to the point where it is supposed to be for either broilers or layers and at the same time controlling the salt intake of birds either as it comes from the mash or by not overfeeding on supplements that contain additional salt.

Soybeans in Dairy Rations

Condensed from Ohio Farm and Home Research

C. F. Monroe, J. W. Hibbs and R. G. Washburn
Ohio Agricultural Experiment Station

IT HAS been shown both in experimental and practical feeding that ground soybeans can be used satisfactorily as a protein supplement in the dairy ration, when it is economical to do so. Soybeans differ from the by-product protein supplements in furnishing a liberal amount of fat or oil. Under certain conditions of feeding, where the fat supplied by the ration is low, the extra fat furnished by the soybeans may be especially valuable. Low fat intake is often encountered when roughages are fed liberally and grain is fed in reduced amounts. This feeding trial was conducted for the purpose of determining the value of the extra fat from soybeans in a system of liberal roughage-restricted grain feeding.

Ground soybeans were used as the only protein supplement in a grain mixture fed to a group of cows in comparison to soybean oil meal fed to a similar group. The mixture with soybeans contained approximately 6.8 per cent fat and that with the soybean oil meal 3.8 per cent fat. Ground ear corn and oats were the only other grain feeds used in the mixtures, which furnished approximately equal quantities of protein.

These grain mixtures were fed continuously to groups of Holstein cows on the Trumbull County Experiment Farm for a period of three and one-half years. With the exception of the kind of grain mixture used, both groups of cows were fed and treated alike or as one herd. As the heifers freshened they were placed alternately in the two groups.

The comparison was carried out under a system of liberal hay feeding along with the use of moderate amounts of grain and corn silage. Grain was fed at approximately the rate of one pound for every five pounds of milk produced. During the pasture season ample grazing was supplied by using permanent bluegrass pastures, supplemented by grazing in the legume meadow mixtures. The two experimental grain mixtures were fed in the barn during the pasture season, only in reduced amounts. The cows were fed and milked twice per day and cared for in a manner similar to that

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used on any good dairy farm. The milk was weighed at each milking and the grain was weighed at each feeding. Estimates were made of hay and silage consumption by weighing the amounts fed and refused on two days each month.

The final results are based on the performance of 14 cows in each group with 25 lactation periods on the soybean oil meal ration and 26 lactation periods on the ground soybean ration. A few of the cows in each group completed three lactation periods on the experimental rations. The length of these periods was about the same on each ration and since this averaged close to 320 days, the productions have been calculated to this number of days. The average production of milk on the soybean oil meal ration was 11,999.7 pounds and on the ground soybean ration 11,321.6 pounds, or a difference of 678.1 pounds favoring the soybean oil meal ration. The average butterfat test was slightly higher on the ground soybean mixture, 3.61 per cent, as compared to 3.47 per cent on the soybean oil meal or a difference of .14 per cent. The production of butterfat was slightly higher on the soybean mixture than it was on the meal mixture. The difference was approximately five pounds, with the one group averaging 411 pounds and the other one 416 pounds.

These differences in production are not considered to be significant. When calculated on an equalized basis and taking into consideration both milk and butterfat productions, the difference amounted to 3.5 per cent. This is a small difference and, for practical purposes the two grain mixtures used in this work may be considered as equal in feeding value.

The amount of feed consumed by the two groups was approximately the same. As previously indicated, grain was fed at a moderate level and both groups averaged a little over a ton per cow during the 320 day lactation period. The ratio of grain consumption to milk production was approximately one to five for both groups. No serious difficulty was encountered in getting the cows to consume the grain mixtures, although the manner of eating shown by some of the cows indicated that neither grain mixture was too well relished. The amounts of hay and silage consumed in each case amounted to a little over 2¼ tons per lactation. During the barn feeding season the cows ate on an average of over 20 pounds of hay per day.

The breeding efficiency was slightly better on the soybean oil meal ration than on the soybean ration. On the former it required 1.45 breedings and on the latter 1.65 breedings for conception. This difference is too small to be

of significance. On both rations the breeding efficiency may be considered as being satisfactory.

Along with this feeding trial, studies were made on the carotene and vitamin A values of the milk produced on the two rations. Reports from other work have shown that the liberal use of raw soybeans in the ration has a depressing effect on the carotene and vitamin A content of milk. We were interested in determining whether the more moderate feeding of soybeans as practiced in this work would show the same suppressing effect.

Samples of the milk collected at various times during the course of the experiment failed to show any significant differences in the carotene and vitamin A content of the milk that could be attributed to the difference in feeding. A further check on this finding was made by feeding these same grain mixtures to groups of cows located at the Experiment Station. In this work, an additional mixture containing linseed oil meal was also tried. The results from this work confirm those obtained at the Trumbull County Experiment Farm.

The linseed oil meal mixture was compared to the raw soybean mixture in a feeding experiment with growing heifers. Both good and poor quality hays were fed in separate feeding periods lasting for several months. Weekly analysis of the blood of these animals failed to show any difference in their carotene and vitamin A values that could be attributed to the grain rations fed. It seems, therefore, at the moderate levels of grain feeding in connection with the use of liberal quantities of hay, that grain mixtures may contain at least 20 per cent raw soybeans without the beans suppressing the carotene or vitamin A values of the milk or blood.

Dairymen have frequently asked the question as to whether they should feed their soybeans or sell them and buy the meal. This work indicates that the beans and meal are of approximately equal feeding value under practical feeding conditions. The extra fat contributed by the beans did not lead to an increased production, even under conditions of liberal roughage and restricted grain feeding. However, raw soybeans may be used satisfactorily in the dairy grain mixture as a protein supplement for extended periods, without suppressing the carotene and vitamin A content of the milk, if the amounts used are moderate and roughages are fed liberally. The market value of the beans as compared to the meal and other protein supplements will decide the issue.

What If You Miss A Milking?

Condensed from The Farmer

WHAT happens to a cow's milk production chart if you miss a milking?

Not much, says University of Minnesota dairyman W. E. Petersen—if you don't miss too often.

Dr. Petersen has just completed the first year of a 305-day lactation test on "the effects of the frequency of milking." The cows in this case were identical triplets—Dolly, Molly and Polly.

Dolly was milked once a day, in the morning. Molly was milked twice a day at 12-hour intervals, and Polly three times daily, at 4:30 a.m., noon, and 7 p.m. All were first-calf heifers and all were hand milked. Each was fed according to her weight and lactation requirements, which, as check weights taken at comparable stages indicated, kept feed from varying the effect on production.

Dolly produced 4043 pounds of milk with 188 pounds of 4.6% butterfat in 305 days. Molly, with two milkings daily, produced 8302 pounds of milk with 351 pounds of 4.2% butterfat. Polly's production chart looked slightly better—8498 pounds of milk and 361 pounds of 4.25% butterfat.

Milking once a day produced less than half the milk of twice-daily milking, but slightly over half the butterfat, which helps prove a theory of Dr. Petersen's. He has long figured cows milked less often will favor quality at the expense of quantity.

Milking three times a day didn't prove advantageous, at least in this first year's test. It took 50% more work, yet produced only a little more milk and practically no additional butterfat.

What relationship does this have to you and a few extra winks on Sunday morning?

First it proves twice-daily milking to be the most practical for the average dairyman. You get about the same amount of milk and save a lot of labor.

Second, you can skip an occasional milking without harming your cows, but don't let it become a habit—like every Sunday morning. "It won't hurt to miss a milking once, but it would be disastrous to do it regularly," says Dr. Petersen.

Missing a milking every seven days might, Dr. Petersen feels, contribute to mastitis or seriously reduce milk and butterfat production. The problem is serious enough, he thinks, to continue the

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Saint Paul, Minnesota, October 6, 1951

study another year.

Not getting all the milk will cut production sharply, also. In one test, reported by Dr. Petersen, a cow let down her milk so poorly that she could be milked dry only about one time in three. Within three months her production was reduced by half, from 20 to 10 pounds per milking.

Put Boxing Gloves On Your Seeds

Condensed from California Farmer

Jack Pickett

Some day in the future every pound of grass seed and field crop seed we stick in the ground will first be treated with a chemical to cut the death losses from seed rot and damping off. We are not usually aware of this tremendous death toll that goes on in our fields.

There are several excellent chemicals sold for this purpose. Most of the better seed houses are getting around to insuring a good stand of their seed by processing the seed they sell. This is a fairly recent development but an important one.

One of these seed treating chemicals is thiuram, an organic sulphur compound which is sold under a familiar commercial name. Its action is to stave off the fungi, normally found, in the soil, until the seed can sprout and attain some vigor. Mercury compounds and other materials are also used for this protective service.

Treatment of alfalfa seed is a case in point. On the dairy ranch of Roy Rodoni at Los Banos, the value of treating seed with these fungi protective chemicals was demonstrated.

Rodoni was planting seven acres of alfalfa so he tried a controlled experiment with seed treatment. He planted half the acreage with treated seed and half with untreated seed. He broadcast 22 pounds of seed to the acre.

When the seedlings were first up a metal ring encompassing 8.5 square inches was thrown on the ground where the untreated seed was planted. Repeated trials showed the ring would encircle

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Los Angeles, California, September 8, 1951

about 34 seedlings on the average. Over on the land where the seed had been treated the ring averaged 52 seedlings.

Of course, the only pay-off is more hay from seed treatment. The figures on this ranch show that on the untreated 3½ acres. Rodoni cut 180 bales, while on the 3½ acres sown to seed which had been protected from seed rot, damping off, and all the other seed fungous diseases, he harvested 220 bales. These were 80-pound bales.

This rancher got a return of an additional $13.71 cents an acre, figuring on $30 hay, for the expenditure of 22 cents an acre for seed treatment. Multiply that by four cuttings and it mounts up fast.

Rodoni said the thicker stand of plants in the 3½ acres of treated seed was finer stemmed and more leafy than the untreated acreage.

Let's take another example of this seed treatment for protection against fungi diseases normally found in most soils. L. D. Rutherford at Goleta, Santa Barbara County, planted some dry land to Sweet Sudan 23 on May 11, 1951. He used a bean planter and put the seeds in rows 30 inches apart.

On the treated seed he got 133 seedlings to the measured area of row compared to only 48 plants in the same footage of row in the untreated seed.

This type of seed treatment is recommended for small grain, cotton, corn, peas, beans, vegetable seeds, grasses and legumes and many other seeds.

In the grains the treatment of seed helps fight smut, stripe, scab, blight, seed decay and damping off. A few cents pays off with a lot of dollars on the grain crops.

The cotton farmers treated about 70 per cent of their seed this year. Investigations in other parts of the country show that treated cotton seed produced a 41 per cent increase in seedling emergence; 33 per cent increase in matured plants; and a 12 per cent increase of seed cotton. They are shooting at seed decay, damping off, anthracnose, and boll rot. This also covers the trouble called "sore shin."

Indian John

Condensed from Acco Press

Bill Tipton

IN THE heart of the Blackland Belt of Central Texas, I found that one of the really good farmers of that area was an Apache Indian. Product of the Mescalera Apache Indian Reservation of Southern New Mexico, "Indian John" Olivas is a relative newcomer to farming, and to the Blacklands. His mother was a full-blooded Apache, his father half Apache, half Spanish, which explains the Spanish-sounding Olivas name.

Living a typical reservation life as a little tot, and later, on a ranch where his father was a hand, "Indian John" hasn't had a day of formal schooling in his life. His has been an education secured through observing things around him, by listening patiently to others tell how they've done things, and then by trying those things himself. His writing may be limited to signing his name to a check, but he knows what that check's for, and he's got the bank account to back it up. And as the older brother of the family, John Olivas has seen to it that the younger members of the family have had not only a high school education, but have been sent to business school or to college. He's determined that with better days, they're going to have the advantages he couldn't have when he was growing up.

John worked with sheep and cattle for a long time, first in New Mexico, then for ten or twelve years in Hockley County, Texas, around Levelland. His father was in ill health, and the doctor advised a move to a different climate, so the Olivas family moved to the Hillsboro area of Hill County, where again John worked on a ranch. It was here that he got acquainted with his present landlord nine years ago, decided to try his hand at farming, and moved into the little tenant house to become a day laborer on the place he now rents.

"Indian John's" farm is just north of Itasca and today, is a model of proper land use. It started out as 202 acres, bought as an investment back in the depression days by the present landlord as a place to which he might retire someday. A few years ago, he

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Houston, Texas, September 1951

added another 110 acres to the farm. It was as rundown a place as you'd find in the Blacklands when he took it over. Its deeply gullied hillsides had been row-cropped to death. It was hard to find a person to manage the farm and follow any kind of soil building program, one who would be content to plant a part of the land to hubam clover instead of cotton, one who would follow a sound soil conservation and pasture improvement program. That had to be done, for the productive capacity of the land was at rock bottom.

Five years ago, after the Olivas family had been living on the place for four years, working there and throughout the neighborhood as day laborers, the tenant resigned to operate his own farm. "Indian John" approached the owner and asked to be given an opportunity to farm the place on shares.

"What are you going to use for money to buy equipment to operate it?" asked the landlord.

"Indian John" replied, "We have saved up $1,800 from our work this year, and I figure that we can buy what we need for a start, and can add to it from year to year." After a week of thinking it over, the place was turned over to the Olivas family, and the landlord admits that this was the best move he's ever made since he bought the rundown land back in the late thirties.

"Indian John" laughs as he tells of that early start, farming on his own. "With a small down payment, I bought a second-hand tractor, some used plows and other equipment. When I started out to buy, I found that my credit was good, and I wanted to save as much of that money as I could for operating expenses. I knew that if we could make that first crop, we'd be all right," he said.

They did make that first crop, and all the crops in the years since then. And instead of a second-hand tractor and makeshift equipment, you'll find plenty of modern equipment on that place today, every piece paid for and the property of "Indian John" and his family. As I made the rounds with him, I counted two Farmall tractors, a combine, a grain drill, a fertilizer distributor, a mower, and numerous plows and cultivators, including rotary hoes. There was a 1950 Mercury passenger car, and a truck, too. It's easy to see by the looks of the place and the home that the Olivas family are properous, successful farmers of the Blacklands.

"Indian John" has helped in most of the building-up process on the place, and has directed the most rapid progress of it, over the past five-year period. "We've used phosphate and hubam clover,

and let it build back the land," he explained. "When we came on the place as day workers, the program which the owner had laid out was just starting. That field over there near the house was so deeply gullied, it didn't look like it would ever grow anything. It was kind of pushed in, the land was terraced, and hubam clover was planted after the phosphate treatment. A lot of this land which had been in row crops every year was put in improved permanent pasture especially on the sloping back side and in the bottom where water overflowed. It soon began to look like a different place, and as a laborer here, I've helped with most of that work."

The same broad plan of developing the place has been followed for the past five years since "Indian John" took over, except that new methods were adopted faster. "I was willing to try anything once," he observed, "and since I started out without knowing anything about farming, I was probably better off than the man who was here before me, and who had some ideas that didn't exactly agree with the owner's plans. When I rented the place, the owner and I made an agreement that we'd try something on a small field first, and if it worked that year, we'd go ahead and use it on all the land the next year. He was teaching me all the time, and at the same time proving that certain methods would work. You know, when you see something proved out that you've helped do, you believe in it."

"Indian John" pointed out that this year just about half the land is in pasture, the other half in crops, about equally divided between cotton and grains overseeded with hubam clover. "That hubam clover is a wonderful crop and works so well with the grains we just can't afford not to plant it," he told me. "Hubam and oats or hubam and wheat grow very well together, and we have an attachment on the combine to separate the seed, so it doesn't make any problem in the harvesting. We rotate the land, so that cotton always follows hubam clover, is never planted two years running on the same field. That makes more cotton, and controls the root rot."

In talking with John Olivas, I found that he had been the first in that section to use the rotary hoe. "The man I rent from had told me that the rotary hoe would work, and he took me in his car to another section to see it at work in a cotton field, after that I was willing to try it," he said. "We rigged it up on one of our tractors, and one of my neighbors came by, saw what we were going to do, and told us that we were going to ruin a good cotton patch.

When we got over our entire field in two days, and he saw what cultivating work it did and how much grass was eliminated, he said he was going to try the same thing. I think he's using the rotary hoe this year."

"Indian John" does what most progressive farmers do in their cotton—makes a three-way operation: cultivators, rotary hoes, and spray rig, all working at the same time on the one round of the field. He's sold on planting early, spraying early, getting his cotton picked early, and plowing those stalks under as soon as harvest is completed.

"If you get after the insects in the four-leaf stage—this early season control that they tell you pays—you stay ahead of the insects and set an early crop. That way, you get the first crop instead of the boll weevil, and if you spray for him, you keep the field clean of other insects, too," he said.

That his methods work is proved by last year's record. On this farm, 65 acres were planted in cotton, and the yield was 62½ bales. When Olivas family ginned twenty to twenty-five bales of cotton before any of the neighbors had started picking, it made them agree that "Indian John" had something in his methods of growing a crop. The Olivas family finished their crop in time to help pick some of the neighbor's cotton. This year, 75 acres were planted in cotton, and the goal is 80 bales.

"Indian John" is sold on running livestock on the farm, too. His landlord set up a fifty-fifty livestock program with him, and they run some sheep and cattle, enough to handle the improved pasture and to eat most of the grain raised on the place. When he saw a Hampshire ram take one of the ribbons at the Fort Worth Fat Stock Show a couple of years ago, "Indian John" talked the farm owner into going in with him on buying that ram to build up the blood of their flock.

On the cattle side of the livestock operation, good grade cows are used, and a registered Shorthorn bull. "That way, we get good calves, animals that take feed well, grow right on off, and make us a profit," he says. It's easy to see that "Indian John's" early training on a ranch with both sheep and cattle fits in nicely with the farm operation now, helps balance the owner's know-how with crops. They got a good lamb crop and a good wool clip this year from their flock.

The best part of their joint livestock operation is that it encourages the improved pasture and grain programs, continues to build up the land and makes it pay its way, and makes for a balanced agricultural program. The

cotton crop is a good cash crop—as witness the new Mercury, and a vacation trip for the Olivas family to Mexico at Christmas last year! If this year's crop should turn out to be a failure, which it hasn't in "Indian John's" five years of running the place, then the grain and livestock could furnish enough income to get by until another crop is made.

In addition to the sheep and cattle, there are some hogs for family lard, bacon and ham supply, and a crop of fryers coming along to furnish good eating, a few hens to give a family supply of eggs. The Olivas family isn't missing any bets when it comes to growing most of what it needs to live on.

As for future plans, "Indian John" is quite happy to help build up this place, for he knows that in doing it, he is doing two things: he's learning how to farm, which is a comparatively new experience for him; and he's making a good living and is saving money while doing it. He knows that the owner expects to retire some day in the distant future, and that he's building up the farm as a place that'll make him a living when he's ready to make that move.

And John Olivas is saving his money, so that one day he may own a farm of his own. He's already thinking in terms of buying 100 acres or more close by, and starting to build it up, although he's not eager to make that move now with land values at record heights. "I think the owner of this place did the right thing in buying a run-down place and building it back. Maybe some day I'll do that for myself," he says.

In the meantime, "Indian John" is farming the best he knows how, is adding to his knowledge, his equipment, and his livestock.

And I imagine that sometimes he thinks back to his start on the Mescalero Apache Indian Reservation in Southern New Mexico, sizes up how far he's come thus far, and looks ahead to the day when he'll be a landowner on his own.

"Indian John" has proved that he's a good farmer, a good soil-builder, and a good citizen, worthy of being called one of the better farmers of the Central Texas Blacklands.

Calf Scours

Condensed from The Jersey Bulletin

W. S. Brittan, D.V.M.
and
Dale Dean, Farm Manager,
Meadowridge Farm

THE MANAGEMENT of a herd of cattle is accompanied by many problems. Of these, one of the most important is the raising of calves. Diarrhea (scours) followed by pneumonia is the most frequent cause of morbidity and/or mortality among viable newborn calves.

The successful operation of a purebred dairy herd depends on raising good, strong, healthy calves in order to perpetuate the breeding program. The economic value of the calves makes it mandatory that they be raised to maturity and developed into profitable, producing animals.

Our chief interest in the past 15 years has been the supervision of purebred dairy herds, and thus we have had considerable experience with the various problems that undoubtedly are encountered by many others engaged in a similar type of work. Certain data have been collected on one herd over a period of several years and, owing to the recent favorable results in the control of diarrhea (scours) and pneumonia in calves, it occurred to us that others might be interested in our procedure.

On the farm where this study was conducted a herd of purebred Jersey cattle is maintained. This herd was assembled about eight years ago and excellent breeding stock was purchased from well-known and established herds. The animals in the herd are housed in well constructed barns and are fed rations as suggested by dairy nutritionists from agricultural colleges. Ample exercise is provided for cows and bulls. A selective breeding program is followed in order to develop off-spring possessing desirable characteristics with respect to conformation and milk production. Sanitation is satisfactory, since stables are kept as clean as possible. Flies are controlled by frequent use of effective insecticides. Electric sterile lamps were installed in the calf barn and in use for the past three years. Separate attendants are provided to take care of the calves and

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adult animals. Calves are permitted to remain with their dam from six to twelve hours after birth and then are placed in individual calf pens. One pint of colostrum and later the same quantity of dam's milk per 20 pounds of body weight are fed twice daily to each calf with a calf nipple bottle during the first week. After the first week, whole milk collected from several cows is fed in the same manner and amount until the calves are from 4 to 6 weeks of age. Grain pellets (calf pellets) and mixed hay then are offered ad libitum.

The records of this herd show that approximately 75% of the calves born during the years 1939 to 1947 developed diarrhea (scours). Pneumonia also developed among many by the time they were 3 months of age. Most of the animals were saved, however, although at considerable expense, with the aid of bacterial antiserum (bovine), sulfonamides, penicillin, blood transfusions, and much extra work for the attendant. In spite of this treatment, many of the animals did not develop as rapidly and satisfactorily as was desired. Quite a few were sacrificed because of unthriftiness and stunted growth. In a discussion of our problem with a colleague it was suggested that a prophylactic treatment schedule be instituted. A suspension of two types of sulfonamide, one sparingly absorbed and the other readily absorbed from the digestive tract, was to be used during the first three to five days of the calf's life. This was given to prevent or overcome the enteric infection that was believed to be responsible for the diarrhea.

The initial dose was given within several hours after birth. The mixture of the drug was given with a small amount of colostrum collected from the dam and administered with a calf nipple bottle. A dose of ½ cc. of "Bovimide" per pound of body weight was given twice daily. In this group there were 23 animals and none of the animals so treated developed diarrhea (scours) during the first six months while they were maintained in the calf barn. They developed very satisfactorily and without question were better looking individuals at 6 months of age than were the majority of those raised during former years.

During this period (1948 and 1949) there also were raised 53 calves that did not receive prophylactic treatment with "Bovimide." Of these, 18 did not develop diarrhea (scours) while 35 were affected at from 1 to 10 days of age. (Three developed diarrhea within the first day, five in two days, six in three days, three on the fourth day, six on the fifth day, four on the sixth day, four on the seventh day, and four on the tenth day.)

On the days that signs of diar-

rhea were noted, therapy with "Bovimide" was begun in 31 of the 35 calves. A daily dosage of 2 cc. of "Bovimide" per pound of body weight, in two or three equal doses, was given in milk for four or five days. Fifteen calves received the drug twice daily while 16 received it three times a day. Of the 31 treated calves, 30 recovered and one died. Of the four that were not treated, three died and one recovered slowly but grew poorly and remained unthrifty. Because of the poor growth and development, it was sacrificed.

The incidence of pneumonia in young calves in the herd has been greatly reduced since we have controlled diarrhea (scours) among the animals. Most cases of pneumonia during previous years (1939 to 1947) generally developed during or within a short time after the attack of diarrhea. It is our opinion that there is a close relationship between the two disease entities. If the diarrhea is prevented or controlled and no other unusual conditions, such as specific infections, are introduced the pneumonia can be controlled. According to a recent report, this observation also has been made by Dr. D. H. Udall of Cornell University.

Summary

1. A combination of three sulfonamides ("Sulfathalidine" phthalylsulfathiazole, sulfamerazine, and sulfamethazine) in a suspension containing koalin and pectin has been found to be very beneficial in the prophylactic and therapeutic treatment of diarrhea (scours) in young calves.

2. Statistical analysis of the data showed a highly significant difference between treated and untreated calves with respect to both prophylaxis and treatment of diarrhea (scours).

3. The control of this enteric infection apparently has aided in preventing serious pneumonia in a high percentage of the animals included in the study.

4. The medication used was safe and convenient to administer to calves.

Feeding Experiments

Condensed from Missouri Ruralist

At the Missouri College of Agriculture Livestock Feeders' Day program feeding experiments with swine, sheep and cattle were discussed. Swine projects studied 2 problems, that of influencing cost of production and carcass quality and feeding antibiotics and vitamins.

J. F. Lasley and F. L. Tribble discussed influence of feeding levels on production cost and carcass quality. Here, the idea was to see what effect various levels of feeding had on reducing the quantity of lard. One method of approaching the problem is through breeding, another is to sell hogs at weightier weights.

Another method of producing more lean meat and less lard is to limit feed during the fattening period. One group of pigs was full-fed all through the test, another was full-fed until they weighed 125 pounds, and then feed was limited, and the other group of pigs was limited-fed all through the test.

Limiting feed did slow rate of gain, it took 33 days more to get these pigs to market weights. Average final weight was about 214 pounds for all 3 groups. The slower-gaining hogs returned less profit, the net return for each pig on the full-fed group was $12.32, and only $9.05 for the limited-fed group. However, the pigs that were first full-fed, then limited-fed, netted $11.25.

The slower-growing and limited-fed hogs did score higher on carcass quality, with a higher per cent of lean cuts, less fat cuts.

Summing up the project, the research reported: "Results indicate that limiting the amount of feed for market hogs during the growing-fattening period increased the percentage of lean meat at market time. However, production costs were slightly higher when limited feeding was practiced. This disadvantage could be overcome by making best possible use of good-quality pasture and farrowing pigs early enough to market them when prices are at their usual seasonal peak. Disadvantages of both full-feeding and limited-feeding were overcome, in part at least, by full-feeding pigs until they reached an average weight of near 125 pounds, then limiting the feed until market weight is reached. When this latter method was used, carcass quality was about equal to that of the limited-fed pigs,

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and production costs were only slightly greater with full feeding."

Feeding vitamins and antibiotics was reported by L. F. Tribble, A. G. Hogan and J. F. Lasley. In one test, 3 B-vitamins were added to a basic ration with soybean oil meal and also with a basic ration with tankage. Rate of growth was increased about 9 per cent, and about 2 per cent less feed was required for every 100 pounds of gain.

In 3 feeding trials, adding B_{12} concentrate to a basic ration of corn and soybean oil meal, an increase in rate of gain was observed in only one trial. In 2 trials there was no increase.

In a dry-lot test, a corn-tankage ration supplemented with 3 B-vitamins was just as good as a ration of corn-soybean oil meal ration containing the same 3 B-vitamins, in addition to a vitamin B_{12} concentrate. It was indicated tankage contains enough vitamin B_{12} to meet requirements of pigs.

What about pasture as a source of B-vitamins? Rye pasture apparently provided sufficient of these vitamins and there were no increases in gain when the 3 B-vitamins and vitamin B_{12} were added.

But on the other hand, vitamin benefits of the pasture could be added to the feed with materials costing about 37 cents for every 100 pounds of feed. Feed costs for pigs fed on pasture and those fed in dry lot with vitamins added were about the same.

Antibiotics were also studied in tests. Increased gains from aureomycin were about 18 per cent, and 11 per cent of the feed was saved to produce 100 pounds of gain, when hogs were fed in dry lot on a corn-soybean oil meal ration. Procaine penicillin was also effective, increasing growth rate by 13 per cent and saving 11 per cent of the feed. Feeding smaller amounts of penicillin was far less effective and saved no feed.

It was definitely shown that effects from the various antibiotics are not the same. Streptomycin was not as effective, and chloromycetin actually decreased gains by 6 per cent.

Amounts of antibiotics fed also make a big difference in results. Adding aureomycin to a ration containing tankage still increased the rate of gain 11 per cent, saved 7 per cent of feed cost.

But here is a note: Neither aureomycin nor penicillin was effective in boosting growth rate when added to an all-vegetable protein supplement when pigs were on pasture. However, pigs getting aureomycin required 7 per cent less feed to make 100 pounds gain.

From the test it appears that from 3 to 5 mg. of antibiotics should be added to each pound of the ration for best results.

A study on sheep was con-

ducted and reported by A. J. Dyer and Melvin Bradley. This was to see whether immature ewes require grain as well as pasture, during pregnancy. Ewes were purchased from the Northwest. One group of ewes was fed a mixture of grain and concentrate during the last 6 weeks of pregnancy and the other group was not fed grain. All ewes got a pound of concentrate mixture after lambing. On wheat and bluegrass pasture ewes gained about 30 pounds last fall, before the last 6 weeks of pregnancy. Then they lost flesh but gained weight during the last 6 weeks of pregnancy. Ewes that were fed grain gained 10 pounds more than those that did not receive grain. After lambing the grain-fed ewes were 11 pounds lighter than they were 6 weeks before lambing, the ewes that did not get grain were 15 pounds lighter. Grain feeding resulted in larger lambs, singles and twins from the grain-fed ewes were 13 per cent larger. On April 6, the difference in weight of ewes was narrowing, with only 3 lbs. difference in favor of grain-fed ewes.

A Breeding Plan

Condensed from The American Hampshire Herdsman

Dr. John F. Lasley
University of Missouri

One of the main objectives of the purebred hog breeder is to produce the type of hog that meets the requirements of both the packer and the commercial hog producer. At the present time the packer is interested in purchasing the type of hog that has a high dressing percentage and which yields a maximum percentage of the valuable cuts such as the ham and loin, with a minimum of excess fat. The commercial hog producer is interested in this same type of hog, but he also favors the kind that reaches market weight quickly on a minimum of feed. The show ring and type conferences of the breed associations are important in establishing the kind of hog to be produced from the standpoint of type and conformation. The production registry activities of the different breed associations are directed toward the production of a type of hog that makes rapid and efficient gains. These two activities together go a long way in helping the purebred breeder to

Reprinted by permission from The American Hampshire Herdsman, Peoria, Illinois, June 1950

plan a breeding program that produces the kind of hogs desired by both the packer and commercial hog producers.

One of the most important problems of the purebred hog breeder and one which calls for considerable planning is the replacement of a proved herd sire. Many times in the past hog breeders have made this familiar statement. "I had to sell my old boar last fall. He sired some of the best pigs I ever raised, but I have so many of his daughters in my herd that I could not use him much longer without inbreeding. I purchased a young boar to take his place." This is a common practice in most herds over the country. It is true that sooner or later the old boar will have to be replaced, but in most cases he should not be replaced with a young, untried boar. Many breeders forget that the boar is one-half of the breeding herd. Therefore, to improve his breeding herd the breeder must use only superior sires. He can not always be certain of the performance of the young boar before such an animal is tested. Plans should be made ahead of time for replacing the old, proved sire so that there is sufficient time to test one or more younger ones for possible replacement.

Considerable planning is necessary even in the selection of the young boar which is to be tested. It is a well known fact that some lines or families of purebreds perform more satisfactorily in crosses than do others. If at all possible, a breeder should purchase a young boar which is more likely to make a successful cross on the gilts or sows in his breeding herd as shown by past crosses of the two lines of similar breeding in other herds.

After the breeder has decided on the line of breeding he wants in the young boar to be purchased, two factors, individuality and pedigree may be used in making the final selection. In the show ring animals are judged entirely on the basis of individuality. This has a certain amount of value since a champion must conform to the type and other ideals of the breed at that particular time. The fact that an animal is a champion of some show, however, does not guarantee that he will be an outstanding sire. Nevertheless, such an animal may be expected to tend to reproduce his kind since it is one of the laws of heredity that "like tends to beget like." Individuality backed up with a good pedigree increases the chances that a young animal will be a good sire, although the two together still do not guarantee it. The pedigree of an animal is actually a record of that animal's ancestry. If his ancestors have been uniform in type and have been uniformly good producers, the individual himself should tend

to be more like his ancestors and produce in the same manner. On the other hand, if the individuals in the pedigree have varied considerably in type and productivity, the individual may be more variable in the offspring he produces. The appearance of the PR stars in the pedigree of an animal is of considerable value in selecting breeding stock. This is an indication of the productivity of the ancestry, and should help to a considerable extent in forecasting the breeding ability of the particular male in question.

The final test of a young prospective herd sire is based on the appearance and performance of his offspring. When two young sires are compared on this basis, the one which is the best producer should be kept for breeding purposes. Young boars may be tested by mating them to younger sows, or possibly to a few older sows. At the same time the older boar should be used on the more productive sows which are not related to him. This is especially true when past matings have been known to produce superior offspring. If the young boars are tested far in advance of the need for replacing the old sire, there will be no need to mate a large number of females to an untried sire. A young boar which fails to breed or produce satisfactory offspring should be discarded and another tested for use in the herd.

A definite plan of breeding and testing should be followed by the purebred breeder in selecting gilts for replacement purposes. The older, proved sows should be kept in the herd until they can be replaced with younger ones which are superior in type and productivity. It is true that older and larger sows have some disadvantages such as mashing a larger percentage of their new born pigs. However, they usually farrow larger litters of pigs which are heavier at birth and at weaning than do gilts which produce their first litters. The older mature sow that is prolific, a good mother and a heavy milk producer, as shown by the size and weight of her litters at weaning time, is the kind to keep in the herd. Replacement gilts should be selected from the litters of such sows. Since gilts are untried until they farrow and wean their pigs, a few of them may prove to be poor producers. On the other hand, some may prove superior to the older sows in the herd. If none of the gilts show promise of being better producers than the older sows, the older ones may be kept until something superior is found. It is thought that sows reach the height of their productivity at about the time they produce their 4th or 5th litters. When a large number of sows is considered, it has been found that after this time they usually begin to decline in pro-

ductivity. This indicates that some of the productive sows may spend considerable time in the herd before they get too old to produce satisfactorily. In spite of this, the smart hog breeder is busy at all times looking for replacements for his sows as well as for the older herd boars.

Many successful breeders make it a rule to keep only top quality females for their own breeding herds. This is one of the best methods of insuring that the quality of the breeding herd will be maintained or improved. For the sake of advertising, it is sometimes profitable to let a few of these top animals go to other breeders. It is the satisfied customer that always comes back to purchase more of the same goods.

Whether to practice inbreeding or not is often a problem which is faced by the purebred hog breeder. In general, it should be recommended that inbreeding be left to the skilled and highly trained hog breeder. Too close inbreeding, or mating of closely related animals almost invariably results in decreased vigor and vitality of the offspring. Inbreeding tends to fix the characteristics of individuals regardless of whether or not these characteristics are good or bad. The ability of the breeder to recognize the good and bad characteristics and to select inbred animals which possess only the good characteristics, in so far as possible, determines the success attained with this method of breeding.

Inbreeding has been used with a certain degree of success in the past for the improvement of some of the breeds of livestock. One possible use of inbreeding is open to the progressive hog breeder who has a high quality herd sire the blood of which he wishes to intensify and keep in his herd. This may be done by linebreeding, which is actually a mild form of inbreeding. In this system of breeding, two or more selected sons of the proved boar may be mated to selected half sisters. From this mating the selected boars from one son may be mated to selected daughters of the other son. If this system is continued, the blood of the original sire is intensified and kept in the herd. However, even this system of inbreeding involves careful selection and mating of the individuals concerned.

As a general rule a breeder who builds an outstanding herd of purebred hogs does not do so by chance alone. Almost without exception such a herd is established by careful testing and mating of animals in the breeding herd over a period of years. The successful breeder is continuously trying to improve his herd through selection for modern type and for productivity. He also practices good management and feeds well bal-

anced, adequate rations to his breeding herd. A combination of these three practices, breeding, feeding and management are essential for the success of the breeding enterprise. Proper feeding and management will not make it possible for an animal to exceed in growth performance its inherited ability for this characteristic. Without breeding to back up proper feeding and management, optimum results cannot be expected in any breeding herd.

Place of Silage On The Farm

Condensed from The Southern Planter

M. F. Ellmore
University of Maryland

THE importance of silage in this country can best be demonstrated by pointing out that approximately five million five hundred thousand acres of corn and sorghum alone are grown for silage each year. In addition, many more acres of hay crops are ensiled.

The word silo is of ancient origin. It was originally the name given to a pit in which grain was stored. Such pits were used in the dry Mediterranean countries long before the Christian era. This practice has been used by many peoples all over the world. The practice of storing or preserving green forage is not mentioned in the early writings.

Silage, as we know it today, probably dates to the sour hay that was prepared by the Germans and Hungarians prior to 1841. The method of preparing this sour hay was very similar to that of making sauerkraut. In fact, many writers believe that the sour hay was a direct descendant of this process. The process consisted of tramping unchopped grasses, clovers and vetch into small pits. Salt was added freely during the filling and tramping.

The first recorded attempt to ensile corn was by Herr Reichlen of Germany in 1861. This silage was made by tramping or packing unchopped green corn stalks into a trench which was later covered with dirt. During the next twelve to fourteen years considerable silage research was carried out in Germany and France.

A Frenchman by the name of M. Goffart was credited with

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Richmond, Virginia, August 1950

being the father of ensilage. This was not because of his outstanding research, but because of the extensive writing which he did on the subject.

The term silo first appeared in connection with the storing of green crops about 1875. The English terms in use prior to that time were "pitting," "potting," and "trenching." It was during this period from 1873 to 1875 that the first silage was made in this country. Acceptance of this method of preserving green forage was slow.

It was largely due to the work of Prof. King of Wisconsin from 1890 to 1900 that started silage on its way to becoming one of the most important feeds of the livestock industry. It was also during this period that above ground silos appeared.

The first silos of this type were square. These silos were not satisfactory because of the excessive spoilage in the corners. Round silos rapidly replaced these early types.

Corn has long been king of the silage crops and probably will continue to be. However, the current trend toward grassland farming is resulting in more and more hay crops being made into silage. In certain areas of the country where the season is too short for the growing of corn, or where erosion limits the production of row crops, the use of hay crops for silage has meant the difference between silage and no silage.

In other sections of the country where corn is well-adapted and where row crops are not a detriment to soil conservation, many farmers are turning to an all grass and legume system. There are certain factors which should be taken into consideration before the dairyman abandons corn as a source of silage.

First, it should be remembered that there is a greater production of T.D.N. per acre from corn for silage than there is from any other forage crop.

Second, in any grassland farming system it is necessary to reestablish stands from time to time. If a well-balanced legume grass system is in use, there will be considerable supplies of nitrogen built up in the soil. One of the best ways of utilizing this nitrogen economically, is by the growing of some crop like corn.

Third, the improvement in the physical condition of the soil by tillage practices that are necessary in the production of an inter-tilled crop will tend to increase the yield of subsequent crops.

Fourth, an inter-tilled crop in the rotation will tend to interrupt the life cycle of certain disease organisms, and also destroy many weeds that may be a problem in later crops.

Fifth, it should be remembered that corn is one of the easiest of the crops to ensile properly as far

as quality of product is concerned. The relatively wide range in the stage of maturity and allowable moisture, plus the high content of fermentable carbohydrates is another reason why corn is king of the silage crops.

On the other hand, hay crop silages have certain advantages over corn silage. It must be remembered, however, that special preservation techniques must be employed if top quality silage is to be made. If the material contains a high percentage of legumes, the protein content will be appreciably higher, consequently the protein content of the supplemental grain mixture may be materially reduced.

It is sometimes possible to save a hay crop by ensiling that might otherwise be lost due to poor weather conditions for curing, as hay. In cases of this nature, the quality of the silage will be lower since the proper stage of maturity for ensiling hay crops is somewhat earlier than the proper stage for making the best hay. Therefore, this practice should be considered as an emergency measure.

On land that is subject to erosion, the greater use of a grassland system will extend the length of the rotation which is a distinct advantage. However, on land that is not subject to erosion, it is doubtful whether extending the length of the rotation has any particular advantage.

It would appear that in the well-balanced farm program there is a place for both corn and hay crop silage. Where corn can be advantageously grown it should provide the bulk of the winter silage requirements.

By using the first cutting of alfalfa and possibly the first growth of rotational pasture lands that are not needed for early pasture, it is possible to provide supplemental succulent feed for use during the summer when pastures may be at a standstill.

If you have the entire day to do something, it will take all day to do it.

—The Sphinx

Death To Sheep Parasites

Condensed from The Ohio Farmer

SHEEP parasites are having a tough time in Union County Ohio these days! This county has had the largest organized sheep dipping program in the state for the past two years. Each year over 8000 head of sheep have been dipped during a 2½-week period in June.

Dipping this many sheep doesn't just happen; it requires work and planning. County Agent F. R. Greeneisen and Ralph Oberdier, commercial sheep dipper, work together with sheepmen of the county to achieve this success. The county sheep improvement committee appoints a group of farmers to work on the dipping project each year.

These folks meet together to work out the dipping program. Then the county agent sends letters telling about it to the sheepmen of the county as well as to all patrons of the lamb pool. A card is enclosed which is to be returned giving the number of sheep to be dipped and location of the farm.

Next, a schedule is made up for the dipper to follow. It will average about eight farms or 500 sheep per day. Cards are then mailed to each farmer giving the day the dipper expects to be at his farm and requesting that the sheep be penned up ready for dipping. This schedule is followed closely, barring accidents or unusual weather.

The charge per head for dipping is the same, regardless of the size of flock. This brings most of the small flock owners into the dipping program which would not be the case if a larger charge were made for small flocks. Larger flock owners like this part of the program for it allows them to put rams out with small flock owners with little danger of picking up ticks or lice.

The equipment includes a large vat mounted on a four-wheel trailer, complete with ramps and runways. Valuable time is saved by using a trained sheep dog to herd the sheep into the ramp. The outfit is towed by a pick-up truck which hauls extra water for use in cases where water is not available on the farm.

The commercial preparation used for the dip is the best that can be bought, and the low price range leaves no excuse for a sheepman to stay out of the program. Dipping is done in June which is

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Cleveland, Ohio, July 15, 1950

early enough to prevent severe tick damage to young lambs. Dipping is also claimed to help prevent fly strike.

Heat Treatment Keeps Eggs Fresh

Condensed from Marketing Activities

Harry E. Goresline

YOU ARE wrong if you think that the only time an egg ought to be heated is when it is cooked or incubated. For over a century it has been known that a certain heat process would preserve an egg's freshness. A recently tested variation of this process called "Thermostabilization" indicates that it has definite commercial possibilities.

Actually, thermostabilization is simpler than it sounds. It means that a substance, in this case, an egg, is subjected to moderate, controlled heat—enough to bring about a slight physical, but no chemical change. The result is an egg resistant to the normal deteriorative changes which occur in storage.

Early accounts of the process reveal a number of variations in the application of heat. Records over 100 years old tell of preserving eggs by "dipping them for twenty seconds in boiling water, and then keeping them well dried in finely sifted ashes." Other sources of the same period refer to a repetition of the momentary hot bath several times, after which "the eggs were placed, small end down, in bran, salt or oats." This, it was noted, kept them "perfectly fresh and good."

By extending the time and lowering the temperature, Professor E. M. Funk of the University of Missouri developed the basic process tested in recent studies by the U. S. Department of Agriculture. This work has been performed under authority of the Research and Marketing Act of 1946. In these experiments a heated, flowing film of oil was used, after which the eggs were placed in normal cold storage. There have been other refinements such as oil temperature control to within 1° F. of a constant, and precise measurement of exposure to this heat. The substitution of oil for water was a logical move, since oil-treating of

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Washington, D. C., September 1951

shell eggs is commonly practiced to preserve quality and improve appearance, and both operations could be carried out at once at little added cost. Results of the work were reported at the 1950 annual meeting of the Institute of Food Technologists.

On the basis of tests involving about 400 cases of eggs, considerable savings appear possible in terms of both dollars for egg processors and quality for consumers. While savings were indicated in a number of ways, perhaps the most positive evidence appeared in measuring the quality loss in storage in terms of U. S. Grade. These tests were performed with eggs which were uniformly U. S. Grade A at the outset. Some receive no treatment, others were oil processed, and a third group was thermostabilized for 16 minutes at various temperatures ranging from 130° F. to 139° F. The results for thermostabilization show a range of 46.7% to 62.5% Grade A eggs remaining after 8 months storage with an average, for all temperatures of stabilization, of 54.9%. By contrast, the untreated eggs had a retention of 1.7% Grade A after 8 months, while the oil processed eggs showed 42.2% Grade A after storage of the same duration.

In these tests, the quality of "naturals" declined rapidly and oil processing markedly retarded this decline. While a lack of consistency in results was noted for eggs stabilized at 134° F. and stored for 5 months, the over-all results showed that stabilized eggs retained quality to a higher degree than oil-processed eggs. Quality loss in untreated eggs was strikingly greater than that for those oil-processed or stabilized.

The reduction of quality loss, translated into physical changes within the eggs, has meant that stabilization prevented the normal deteriorative thinning of egg white during storage. Thermostabilization increased the albumen index, and it remained higher during all storage periods than the indices of "natural" and "oiled" eggs. Finally, there was considerably less moisture or weight loss in the thermostabilized eggs than in untreated eggs.

Further studies of the process to be completed in December will help to determine the status of stabilization in commercial egg marketing. Established thus far are the low cost and the speed with which the process can be performed—in addition to the real promise offered on the basis of the first round of substantial testing.

Fuller reports will be made available later, both on the completed studies and the work under way. These will be released by the Production and Marketing Administration of the U. S. Department of Agriculture.

TCA As Control For Johnson Grass

Condensed from Down To Earth

Professor C. J. Willard and R. A. Peters
Ohio State University and Ohio Agricultural Experiment Station

Our first work with TCA was on quackgrass. Since September 1949 the writers have conducted an intensive study of TCA on Johnson grass in Pike County, Ohio. The results have shown that TCA is a promising Johnson grass control material.

In the fertile river valleys of southern Ohio, Johnson grass has been spreading since before 1930. In 1935 a survey by county agents showed more than 1,000 acres actually abandoned to Johnson grass. Despite high prices of farm products, hundreds of acres of fertile soils in these bottoms are still abandoned each year.

Johnson grass sometimes is not hard to control in Ohio under rotations including hay and winter barley, or on upland soils. For example, it can be heavily pastured, or cut twice or more for hay, until July, then plowed and the ground kept worked until September. Winter barley, which ripens before Johnson grass is large enough to interfere with harvest, is sown in the fall, and harvested about June 15. The ground is plowed at once and another summer of cultivation will give commercial control. If it is to go in corn the next year, a cover crop of rye, winter wheat, or winter barley can be sown.

But these bottom lands are particularly adapted to corn, and the owners of the land wish to grow corn as often as possible. Corn growing in Johnson grass is not possible, or at least not profitable. Johnson grass starts to grow most vigorously just as the corn is laid by; by then almost every hill harbors more Johnson grass than corn. Even the most vigorously cultivated checked corn under these conditions will make an unprofitable yield, and is difficult to harvest by machinery.

We have applied TCA almost monthly throughout the year, under six cultural treatments. Some of our results to date follow, but any conclusions based on such a short period must be tentative.

1. As with quackgrass and, indeed, more definitely, cultural treatments add to the effectiveness of TCA on Johnson grass, at least in our trials. In a series of comparisons of unplowed Johnson

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Midland, Michigan, Fall 1951

grass and plowed Johnson grass treated at the same time at low rates of TCA, the treatments on land plowed before applying have always been more effective. (Enough TCA can be applied to kill untreated sod—if Johnson grass in the unplowed sod is killed, the plowing can do no more.)

2. We found no evidence that translocation of TCA from the tops to the roots or rhizomes was of any field importance. On the contrary, we found it difficult to apply TCA to Johnson grass over 12 inches tall, and would suggest treating when there is no growth or only short growth, or even mowing and removing the hay before treatment. Every indication is that Sodium TCA, like sodium chlorate, acts mainly and most effectively through the soil, even though the tops of plants can be killed at once by contact sprays of either. Although there are usually a few living rhizomes left, 50 pounds per acre of commercial 90% sodium TCA (40 lb. actual TCA) has usually given a commercially satisfactory kill of Johnson grass which was plowed before treatment, and which had not been allowed to accumulate large reserves in the rhizomes.

3. Treatments in the dormant stages in March and April, and as growth starts in May have been particularly effective in killing Johnson grass rhizomes. These sods were not plowed since the soil was too wet. Another effective period for treating Johnson grass that has been kept mowed or heavily pastured all year so that the rhizomes are weak has been August and September. We have treatments in November in only one year, 1950, but these were not favorable, compared to the spring dormant treatments. We do not know why this was, but since the season was quite wet and cold, a theory would be that the TCA was leached out of the soil before the almost completely dormant roots absorbed enough of it to be killed.

4. This work was conducted on an open, friable river bottom soil. On this soil the TCA was reduced to a level which permitted Johnson grass seedlings to become established within 60 days of May and June applications. This also represents the necessary waiting period after treatment, before corn can be planted on this soil. Where Johnson grass was treated April 26 and corn planted June 8, it was severely damaged but following Johnson grass treated March 31, corn planted June 18 was uninjured.

Just how best to use TCA for the practical control of Johnson grass in these bottoms is not yet clear from these experiments. Eradication of Johnson grass once and for all, including the neces-

sary control of seedlings, is not feasible since most of the land is subject to floods which bring in seed, so Johnson grass will take possession again, if not vigorously fought.

Despite the good results from April and May treatments they are of limited practical value because no crops can be sown for 60 days after treatment. Much of the growing season is lost. Furthermore Johnson grass seedlings appear after 60 days, and if not vigorously fought, will be completely established before fall. If corn is grown, seedlings establish in the hills and produce seed to reinfest the field.

Since corn planted May 15 to June 1 will make a good though not maximum crop, treating March 15 to 31 and planting corn 60 days later may be satisfactory. We have a 1951 planting of this kind which looks promising. A practical difficulty is that March is the month of floods in these bottoms so that it is often not feasible to treat at this time.

Alfalfa-Johnson grass sod cut three times for hay, plowed late in August, and treated with about 50 pounds of sodium TCA, produced a good corn crop the next year with ordinary cultivation—the Johnson grass was about 95% controlled. However, in this particular test, working the August plowed land twice during the fall controlled the Johnson grass equally well.

Low rates of TCA have been effective on Johnson grass in alfalfa. Rates of 12½ and 25 pounds per acre have suppressed most of the Johnson grass in a Johnson grass-alfalfa mixture when applied in August. With rates higher than 25 pounds per acre the alfalfa was definitely injured, though some alfalfa has survived even 100 pounds per acre of TCA.

The effective control possible with TCA surely indicates a large place for it in Johnson grass control. Better ways of integrating its use with the basic cultural controls will continue to be worked out.

EDITOR'S NOTE: Much information is available on the effectiveness of Sodium TCA in controlling both established stands and seedling infestations of Johnson grass. This article takes a different slant and discusses the problems involved in using TCA to control Johnson grass on land continuously planted to corn which is not tolerant of TCA. This special situation is found in river bottoms of southern Ohio, and probably in similar areas elsewhere. The authors also present certain other information of interest and value.

Tall Fescue for Trouble Spots

Condensed from Iowa Farm Science

Virgil B. Hawk
USDA Soil Conservation Service

MAYBE you've got "problem areas" on your farm—places where erosion is hard to stop, spots that are normally too wet for growing good pasture.

If so, you'll want to check on a new grass called *tall fescue*. This grass is adapted to Iowa's heavy soils and performs well under wet conditions. It looks like a good bet for:

Controlling erosion on terrace ridges, lanes and overgrazed areas in brome-alfalfa pastures.

Protecting waterways and terrace outlets where dense sod, moderate palatability and ability to grow on wet soil are desirable.

Getting productive pasture on areas that are too poorly drained for smooth brome.

The thing to remember is that in Iowa, tall fescue is for specialized use only. It probably won't be used widely for pasture as it is in the southeastern states and in the Pacific Northwest. And if you have light, sandy soil, you won't have much luck with tall fescue. It just won't persist on that kind of land.

There are two commonly used strains of tall fescue, one called Kentucky 31 and the other known as Alta. We've tested them both at the Soil Conservation Service Nursery and on Iowa Agricultural Experiment Station farms. Under conditions in this state, there's no marked difference between Kentucky 31 and Alta, though most of our work has been with Alta.

Alta fescue is well suited to wet soils, as is Ioreed canarygrass. Canarygrass is superior in ability to withstand flooding, in control of gully erosion and in yield. But fescue is much easier to establish. And, very important, it produces about four times as much seed as the canarygrass.

Alta fescue has been tested in mixtures with legumes at the SCS Nursery in Ames for more than 5 years. With alfalfa and red clover, on Webster silt loam, it produced excellent yields of hay. And fescue was much more persistent than timothy.

Alta seems to be less competitive than smooth brome with

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birdsfoot trefoil. Well-balanced mixtures of fescue and trefoil were maintained for 5 years on Clarion silt loam.

Ladino clover and Alta fescue, both adapted to wet soils, seem to form a good wet-land pasture mixture. Our trials indicate that with clipping, a balanced mixture of these two plants can be maintained.

Because it's only moderately palatable, tall fescue is a logical plant to use on areas where overgrazing is a problem. It's more palatable in early spring and late fall, when the leaves are young and tender. And livestock like the fescue better if it's clipped frequently and heavily fertilized with nitrogen.

Early spring seems to be the best time to seed tall fescue. But you can get good results with *late summer* seedings if the grass is well established before winter sets in. Fall seedings usually winterkill.

A seeding rate of 10 pounds per acre is adequate in most cases. But for waterways this rate should be doubled or tripled (20 to 30 pounds). If you're in a hurry to get a strong, thick turf, use a very heavy rate—between 1 to 2 pounds per 1,000 square feet (45 to 90 pounds per acre).

We're still testing tall fescue. Trials, demonstrations and experiments are going on in all parts of the state. So, before long, we hope to have more news about tall fescue—the grass that may help you take care of trouble spots on your farm.

STATEMENT OF THE OWNERSHIP, MANAGEMENT, CIRCULATION, ETC., REQUIRED BY THE ACTS OF CONGRESS OF AUG. 24, 1912, AND MARCH 3, 1933, AND JULY 2, 1946

of the Farmers Digest, published 10 issues a year at Ambler, Penna., for October 1, 1951

State of Pennsylvania } SS
County of Montgomery }

Before me, a Notary Public in and for the State and County aforesaid, personally appeared L. Bush-Brown, who being duly sworn according to law, deposes and says that he is the publisher of the Farmers Digest and that the following is, to the best of his knowledge and belief, a true statement of the ownership, management, etc., of the aforesaid publication for the date shown in the above caption, required by the Act of August 24, 1912, as amended by the Act of March 3, 1933, and July 2, 1946 embodied in section 537, Postal Laws and Regulations, to wit: 1. That the names and addresses of the publisher, editor, managing editor and business manager are: Publisher, L. Bush-Brown, Ambler, Pa.; editor, L. Bush-Brown, Ambler Pa.; assistant editor, C. Leavitt Dyer, New Hope, Pa.; business manager, A. E. Heick, Ambler, Pa. 2. That the owner is: Farmer's Digest, Inc., Ambler, Pennsylvania, and that the names and addresses of stockholders owning or holding 1 per cent or more of total amount of stock are: L. Bush-Brown, Ambler, Pa., C. Leavitt Dyer, New Hope, Pa., A. E. Heick, Ambler, Pa.
3. That the known bondholders, mortgagees and other security holders owning or holding 1 per cent or more of total amount of bonds, mortgages or other securities are: none. Signed, L. Bush-Brown, Publisher.

Sworn to and subscribed before me this 3rd day of October, 1951 (Seal). John F. Cassidy, Notary Public. [My commission expires January 7, 1955.]

Mulches in Establishing Grasslands

Condensed from the Kentucky Farmer

THE ideal seedbed for forage seeds has (a) an abundance of moisture in the plowed layer and subsoil, (b) firm, compact soil under the seeds, (c) fine but granular soil to cover seeds, and (d) the plowed layer well connected with the subsoil, with no layers of trash between them. These are always important but are of maximum importance for summer and fall sowing.

In addition to these, the application of a mulch to the surface of the soil after sowing is most valuable. One cannot over-estimate the value of a mulch in obtaining a good stand. Part of the worth of a surface application of manure is as a mulch. Other strawy or light materials may also be used.

Mulches affect the stand obtained in many favorable ways. In winter and early spring seedings, they protect the seedlings from cold, and, still more important, from freezing and thawing. With forage seed sown in a winter grain, the stand will be increased if the grain is mulched with straw in December.

Mulches conserve soil moisture near the surface and prevent puddling of surface soil, thereby permitting greater moisture infiltration. Soils stay moist longer under even a trace of mulch than where no mulch is used. When seedlings are struggling to establish themselves, this slight extra moisture often saves a large proportion of them.

The application of a mulch just after summer sowing will do more to insure a stand than any other one thing. It saves the moisture at the surface where it is needed and tends to prevent the formation of a crust, both by breaking the force of the rain and by retarding the drying of the soil, thus permitting more seedlings to come through.

In the application of a mulch, three points should be observed: (1) Put it on at once after sowing; (2) apply no more than 1 to 1½ tons of straw or 4 to 6 tons of manure per acre; (3) put it on with a mechanical spreader, as neither straw nor manure can be spread sufficiently evenly by hand.

Reprinted by permission from the Kentucky Farmer
Louisville, Kentucky, July, 1951

Cholera in Turkeys

Condensed from the Turkey World

Dr. J. O. Alberts
University of Illinois

Few diseases can cause greater concern to an experienced turkey grower than an attack of fowl cholera among his birds. We have seen outbreaks of acute fowl cholera put a finish to future turkey growing programs of erstwhile beginners.

Fowl cholera is an infectious disease, which means that it is caused by a microorganism, a bacterium known as *Pasteurella multocida.* There is no relation between fowl cholera of turkeys and cholera of swine. This germ, in so far as turkeys are concerned, produces a highly contagious disease, which means that the disease spreads rapidly from the sick bird to the healthy bird.

While the infection is widespread, the number of outbreaks is small compared with other diseases such as blackhead and paratyphoid, "Salmonellosis." Most outbreaks are seen in the fall and winter months, although the disease can appear during any season. It may be common in a locality for a few months or years and then apparently disappear for an indefinite period. It sometimes occurs at the same time on farms in different parts of the state. On other occasions, individual outbreaks may appear in widely scattered areas.

Losses in fowl cholera vary. These differences in the number of birds that die in separate outbreaks are due in part to differences in the virulence (killing power) of the germ, the susceptibility of the birds, and the environment (surroundings as influenced by such factors as changes in weather or management practices). In one reported outbreak, only 17 percent of the birds died. We have seen fowl cholera destroy 72 percent of a flock, and if the flock owner had not marketed the remaining 28 percent it seemed possible that most of these birds would have died.

The disease is seen most often in mature turkeys or those approaching marketable age (4½ to 8 months). On the other hand, younger birds may be affected, and recently we observed an outbreak in poults only seven weeks old. All breeds of turkeys appear equally susceptible to fowl chol-

Reprinted by permission from the Turkey World
Mt. Morris, Illinois, October, 1951

era. Similarly, all species of domestic fowl can acquire the disease. There seems to be no difference in Pasteurella organisms that kill turkeys and chickens.

As in the beginning of most outbreaks of an acute infectious disease, only a very few birds appear sick or die at first from cholera. It is at this time that many turkey growers are "caught short." Too many poultry growers accept without a definite explanation the loss of two or three birds during a single day. This is the time when you should obtain the services of a qualified veterinarian or poultry pathologist. A loss of two or three hens or toms may be the first signal of an approaching outbreak. Even though you may be good at guessing or have a lot of experience with turkeys, it is necessary for you *to know* the cause of the losses.

Some of the common symptoms of fowl cholera are listlessness, roughness of feathers, increased thirst, drooping of the wings, and a watery, yellow or green chalky-streaked diarrhea. The body temperature increases 2 to 6 degrees F., and the shanks feel quite warm to touch. In the final stage of the disease the head often appears dark red to purple in color. A mucous exudate drools from the mouth and nostrils of some of the affected birds. The peak of mortality usually occurs between six and nine days after the first loss. In turkeys showing typical symptoms, death occurs within 24 to 48 hours. Relatively few turkeys develop chronic symptoms of arthritis, emaciation or nervous disorders.

Since the disease lasts but a short time, most affected birds appear in good flesh at death. The muscles of the breast and legs are reddened and scattered areas of hemorrhage are often seen in these regions. In addition, hemorrhagic lesions occur in the heart, over the surface of the liver and the lungs. The heart is usually enlarged and the heart sac contains a clear, yellow-tinged fluid or a stringy, white-flaked exudate. Although the liver is not greatly enlarged, it breaks apart easily and varies in color of light brown to brownish red. Numerous, small pin-point or somewhat larger abscesses are sometimes seen beneath the outer thin capsule of the liver.

In the alimentary tract, the following changes are often observed. The crop is generally well filled with feed, because the affected bird eats until a short time before death. The contents of the crop give off a sharp, acid or sour odor. A marked reddening of the inner lining of the intestine is noted. The contents of the intestinal tract are more liquid than normal and contain an excess

amount of mucus.

Laboratory examination, including bacteriological tests, is necessary for an accurate diagnosis. While the changes described above occur in fowl cholera each of these changes can occur in other diseases. The symptoms and lesions of cholera may be confused particularly with bluecomb, erysipelas, fowl typhoid, Newcastle disease, vitamin A deficiency, and chemical poisoning.

Where does the disease come from and how? These are the most common questions asked by owners of affected flocks. In areas where the disease has appeared for two or three consecutive years the answer may not be difficult. Yet, when cholera strikes a flock in a vicinity for the first time, where it came from and how is not only difficult, but sometimes impossible to answer. We don't know all the answers about fowl cholera.

Because the infection is caused by a bacterium, the ways of spread follow the general pattern of most bacterial diseases. In affected flocks, the bacterium is spread from affected to healthy birds by direct contact. There is evidence that *Pasteurella multocida* is a respiratory tract invader rather than an alimentary tract invader. By this statement, we mean the germ enters the body of the bird through the respiratory tract and then enters the blood circulatory system to produce a bacteremia (bacteria in the blood stream). After the disease becomes established, large numbers of Pasteurella organisms are probably eliminated in the manure as well as in the mucus from the windpipe and nostrils. Under such conditions the surroundings are heavily contaminated and the healthy birds are exposed to the disease more rapidly.

The infectious germ may live for some time outside the body of the living bird. It has been reported in the carcasses of dead birds and in manure for as long as three months. If frozen the bacterium may live for a month. While high temperatures and sunlight kill the germ quickly, it may survive for weeks and months in cool, shaded surroundings.

Many outbreaks of cholera occur on farms where owners let young and old birds range together. Birds that recover or are exposed to fowl cholera may become carriers of the germ. These carrier birds can transmit the germ to healthy, susceptible birds and may be the source of an outbreak of the disease. The addition of newly purchased stock to a breeding flock has been the source of an outbreak of cholera. While we like to condemn free-flying birds, such as the sparrow and finch, as carriers of the disease

agent, we still need more information on this factor. We do know that wild ducks, geese, and pheasants are susceptible to this disease, and occasionally these birds have been observed to eat with turkeys on range. Flies that have fed on blood of cholera infected turkeys have been reported capable of transmitting the disease. Similarly, dogs, foxes, or skunks may serve as mechanical carriers in spreading the germ. *Pasteurella multocida* has been found in the last eggs laid by acutely infected hens. Egg transmission of the disease, however, is not regarded as important. Fertile eggs containing the germ do not hatch. Furthermore, the disease is rarely seen in birds less than three months old.

In suggesting preventive measures for fowl cholera, and this means keeping the disease out of the flock, certainly the basic fundamentals of good sanitation and hygiene must be applied. Most livestock growers groan when the words "sanitation and hygiene" of the turkey flock are mentioned. It only means good judgment put into action. The following suggestions for prevention of fowl cholera or any other infectious disease are basic for profitable turkey raising.

1. Turkeys like congregating around puddles of stagnant water —but there is greater safety in providing them with land that drains well and fast.

2. Moving the birds to new range land frequently, depending upon the number of birds, condition of the pasture, and weather, has proved a sound practice.

3. Separate growing birds of different ages, and particularly from breeding stock. Older birds may be carriers of Pasteurella.

4. Turkeys ought to be segregated from other fowl.

5. You are asking for trouble when you return exhibition or show birds to the main flock.

6. Avoid sudden changes in rations, especially from a dry feed to a succulent pasture feed.

7. Protect your birds against severe changes in the weather by constructing good range shelters or developing wind breaks.

8. Clean and disinfect brooders or quarters for older birds in confinement, and provide healthfully equipped feeders and waterers.

9. Good housing and fencing will keep the birds from excitement, injury and exertion that follows the entrance of stray dogs and cats and such wild animals as skunks and foxes.

Pasteurella multocida prefers to attack when the body resistance is lowered. It's your job to protect the birds against those things which lower the resistance of your birds.

The problem of vaccination against fowl cholera has been dis-

cussed for years. Most American investigators have concluded that fowl cholera bacterins now available *are not effective.* Now, of course, anyone can argue that because they had cholera in their flock two years ago, then vaccinated this year and last year and haven't had the disease, the vaccination therefore prevented cholera. Actually, cholera has shown this same situation in flocks that were not vaccinated. Neither has the cholera bacterin any proved value in treating the flock already affected with the disease. The Pasteurella germ just does not seem to have the ability to produce a good immunity when prepared as a bacterin for vaccination. Perhaps one of these days some investigator will devise a new procedure for the preparation of an effective bacterin (killed Pasteurella germs in a liquid suspension) or vaccine (live Pasteurella germs in a liquid suspension).

Some of the sulfa drugs such as sulfathiazole, sulfamerazine, sulfamethazine, and sulfaquinoxaline have been reported effective in reducing losses due to acute fowl cholera. Recommendations for the use of these drugs are almost always outlined in a general way by the company manufacturing or distributing the drug. While general recommendations can be given, they leave us in an undesirable position, since the owner is the only one in most instances who is familiar with his flock problem. Who knows whether the birds will eat the sulfa-mash mixture or drink the water containing the sulfa? If they do, will they drink enough? Each turkey flock represents an individual problem. The services of a qualified veterinarian, or a poultry pathologist are needed when disease strikes your flock. You need expert advice and action. You have a sizeable investment in money if you are really in the turkey business. Whenever losses exceed 9–12 percent in mature birds or those approaching marketable age—your profits are gone.

None of the sulfa drugs is a cure-all for cholera. After a course of sulfa treatment is ended, often the disease recurs a few days later. The sulfa drugs do not kill all the Pasteurella germs in the body of an infected turkey. The effective sulfa prevents the germs from multiplying, which gives the body defenses a chance to eliminate the germ—however, some of the birds still harbor the germ and become carriers. These are the birds that are responsible for the reappearance of cholera in the flock after treatment is stopped. You can't pick these birds out by looking at the flock; some of these carrier birds appear remarkably healthy so far as the eye can

see.

When an outbreak of fowl cholera has been checked or as soon as the surviving birds have been marketed, thorough cleaning and disinfection of all equipment is the next move (a high pressure steam cleaning unit is economical). Survivors of an outbreak should be sold at least one month before young stock is brought on the premises. Birds that died during an outbreak can best be disposed of by a burial pit, with a screen cover to prevent insects and rodents from entering the pit.

Protein

Protein is necessary to life and is never absent from living substance.

Without protein, no life appears possible on this earth, for through its means the chief phenomena of life are produced.

Protein is a universal component of tissues in both animals and plants.

More than 100 years ago a Dutch chemist selected the Greek word proteios meaning first, to name this molecule which is first in the regulation of vital processes.

Proteins are normal parts of all animal cells and body fluids with the exception of the bile and urine, and they exert a profound influence on growth.

The protein in the human diet is obtained from both animal and vegetable sources.

Among the foodstuffs of animal origin, meats, fish, eggs, milk, and milk products are the most important.

Vegetable protein is readily available in the cereal grains, peas, beans, and nuts.

From the protein molecule we get the necessary amino acids, the substances of which protoplasm, or the living cell, is made.

The amino acids are referred to as the building stones from which the human body forms its protoplasmic structure.

Protein food is digested to the stage of amino acids and these circulate around to be absorbed by the various tissues, where they form new tissues and fluids.

It is obvious that man must eat enough protein food to supply his body with material to keep it functioning well.

Your Health
Medical Society—State of Pennsylvania

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"There is a time in every man's education when he arrives at the conviction that envy is ignorance; that imitation is suicide; that he must take himself for better, for worse, as his portion; that though the wide universe is full of good, no kernel of nourishing corn can come to him but through his toil bestowed on that plot of ground which is given him to till.

—Ralph Waldo Emerson
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